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A Clinical Lecture
ON
GUNSHOT WOUNDS OF THE LUNGS.

Delivered at Guy's Hospital on Nov. 10th, 1915,

BY W. HALE WHITE, M.D. LOND., F.R.C.P. LOND.,

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GENTLEMEN,—Many of you are either just qualified or soon will be qualified, and therefore will shortly be engaged in military work. Consequently I thought it might interest you if I gave you some account of bullet wounds of the chest, for in ordinary civil practice many doctors never see one, yet in warfare they are very common, and I chance to have seen a large number since the war began.

EFFECTS OF BULLET WOUNDS OF THE CHEST.

What will strike you most is that the effects are not more serious. Of course some patients are killed at once or die soon after, others have grave results as empyema; still, if you have to do with large numbers you will be impressed with the extreme good fortune of many who are hit in the chest. This was not always so, for according to Colonel L. A. Lagarde, U.S.A.,[1] the mortality of penetrating wounds of the chest in the French army during the Crimean War was 91·6 per cent., in the English army over 70, and among those which survived to reach hospital in the American Civil War it was 62·5 per cent. But with the introduction of small bullets of high velocity it began to fall. Thus in the Spanish-American War it was 27·5 per cent., in the Boer War 14 per cent., and among the Japanese in the Mukden battle 3·67 per cent. In the present war, although the mortality is low, it is probably not as low as the last figure.

Escape of Important Structures.

Some bullets seem almost to thread their way through the important structures in the thorax and so evade them. If the wound is at the upper part of the chest it appears almost impossible, considering the position of the entrance and exit wound, that the spine, the large arteries and veins, and the aorta should be uninjured, yet we can detect no signs of damage to them.

I have seen a man who had his left recurrent laryngeal nerve damaged by a bullet in the chest and yet the large vessels were unhurt, and in another instance the only evidence of damage to any other structure than the lung was that the pupil was larger on the damaged side than on the other. In a man of about 30 years of age a bullet entered the back, going through the body of the right scapula just below the outer part of the spine. It passed forwards and upwards through the lung, fractured the sternal end of the right clavicle into several pieces, and emerged at the right sterno-clavicular joint. It damaged no artery or nerve of sufficient size to give any evidence of such damage.

Here is another instance of a narrow escape. A man, aged 54, whilst waving his arm was hit by a bullet at a point on the inner margin of the left deltoid 2 inches above the insertion of the muscle. The X rays showed it to be lying in the posterior part of the chest 6½ inches from the skin on the front behind the superior vena cava; it moved up and down with respiration and from side to side synchronously with the heart. At first after the injury there was severe pain in the chest; dyspnœa and inability to lie down lasted a week. On arrival in this country less than three weeks after the injury there were no abnormal physical signs, he breathed easily and could lie down and walk about with comfort. A case in which the bullet went in the opposite direction was the following. It entered the second left intercostal space close to the sternum and lay under the skin close to the insertion of the right deltoid muscle. Here there was no evidence of damage to any important structure except the lung.

This possible good fortune may not only attend those who are hit in the upper part of the chest, but those who are hit in the lower part. For example, a young man was hit by a bullet close to the sternum in the fifth left intercostal space. The bullet could be seen with the X rays to lie in the upper part of the liver near the tip of the eleventh rib, or more probably in the deeper part of the abdominal wall at this point. Immediately he was hit he had a pain in the chest, but he neither coughed nor vomited any blood. For a short time he had dyspnœa, but that soon passed off; and when examined in this country two and a half weeks after the injury there were no abnormal physical signs in the chest, and he seemed well. In another case a bullet entered over the heart, but did not as far as could be discovered damage it. Passing to the right it caused what was concluded from X ray examination to be a large blood clot on the top of the liver. As showing how bullets may travel, I have seen a bullet which entered the chest found lying in the psoas; here, too, no important structures were damaged.

Slight Harmful Effects on the Lung.

The following are of interest, not so much because of the avoidance of important structures as that the effects are not more severe.

One of the most remarkable examples was that of an officer, aged 47, who was hit by a bullet at a range of 100 yards. He estimates that at the time it struck him it was travelling at the rate of over 2000 feet a second; it passed through a silver cigarette case and then straight through the chest. He was able to walk a mile before he reached medical aid but felt short of breath on arrival. At no time had he any pain or discomfort, and so little did he feel the effects of his wounds that at the end of half a mile he declared he had not been wounded, but his servant said he had for he had blood on his clothes. At the end of his walk he coughed up a little blood, and this hæmoptysis continued for two or three days, but he had no other effects of his wound. The wound of entrance was between the left fifth and sixth ribs 1½ inches external to the nipple line; that of exit between the ninth and tenth ribs in the line of the angle of the scapula. When I saw him a fortnight later both wounds were healed. There was absolutely nothing wrong to be detected in the left chest, and he made no complaint whatever. The air entered equally on the two sides, the physical signs were normal, and he breathed easily and normally; he was not short of breath.

Another case was that of a man who was hit by a bullet that entered the chest in the left axilla and

[1] Gunshot Injuries, 1914.

passed out at the middle of the back on the same side. He had slight hæmoptysis, but when I saw him a few days later I could find no abnormal physical signs, and at the end of four months he returned to active service at the front. A man was hit by a bullet which entered the chest just below the inner end of the right clavicle; the point of exit was below the angle of the right scapula. He had a little hæmoptysis, and when seen here he had signs of a moderate degree of hæmothorax. Nine months later he wrote to me saying: "The wound through my lung has gone completely as a dream at night. I am just off to the Dardanelles."

In another case the bullet entered through the scapula just below the spine, and the X rays showed it lying in the lung at the level of the tenth rib. He was very dyspnœic for some time, and there was some collapse of the lung causing flattening of the left chest. Yet seven months later he is doing light duty, and he writes: "I am now quite all right, although very short of wind after violent exercise. My left side has filled out until it is practically the same as the right. The shrapnel has not been removed. I am I hope shortly returning to the fray." In a young lieutenant a bullet went straight through the left chest, passing out through the scapula. There were hardly any abnormal physical signs. Six weeks after being hit he was passed as fit for light duty, and a month later as fit for active service. I heard from him after he had been doing this four months, and he said he had been working hard without any ill-effects. In another lieutenant the bullet entered just below the right subclavian and passed out through the right scapula. He had a good deal of hæmorrhage from the lung, but four months later he writes: "I am glad to be able to tell you that my chest has made a perfect recovery, and now I suffer from no ill-effects of my wound."

Here is one other case. A young officer was hit by a bullet which passed right through the right chest from back to front. He had hæmoptysis, but when seen here three weeks later except for a little dullness at the right base his chest seemed healthy; the entry of air and movement of the chest were normal. Five months later I heard from him, and he said: "My chest has made a perfect recovery, and I now suffer from no ill-effects of my wound."

I might, if time allowed, give you many more instances illustrating, firstly, that bullets may, even when it seems almost impossible, considering their track, avoid damage to nerves and vessels; and, secondly, when they pass right through the lungs the harmful effect on the lung may be slight.

SYMPTOMS.

We may now turn to the symptoms. Usually there is some pain felt when the bullet enters the chest, but exceptionally the patient may be hardly aware he is hit, and then he suffers neither from pain, hæmoptysis, nor dyspnœa. Perhaps the last is the commonest symptom; sometimes it takes months to pass away, sometimes it is very severe for a few days and then quickly goes. Both in intensity and duration it is most variable. Often there is a hæmothorax or other reason for it, but often the explanation is difficult, for it may exist when there are no abnormal physical signs in the chest. Not infrequently I have been able to convince myself that the dyspnœa is partly functional; the patient does not move the affected side properly because he is apprehensive. None of my patients have been livid, and all breathed quietly and easily when in bed, even when they have been seen a few days after the infliction of the wound.

HÆMOPTYSIS.

Hæmoptysis is very common; from what the patients tell me it occurs in at least three-fourths of the cases, probably more. The amount of blood coughed up is naturally very variable, for it must depend upon the size of the vessels damaged, and will, other things being equal, be greater in proportion as the bullet goes near the root of the lung, as there the vessels are larger than at the periphery. Doubtless it is sometimes immediately fatal, but if it does not kill soon it rarely, if ever, does later, for I have had no case of fatal hæmoptysis in this country. The bleeding usually stops in a few days and does not recur, but one officer had a recrudescence of hæmoptysis several months after that which followed the wounds had ceased. No reason for this could be found: there was no evidence that he had phthisis.

HÆMOTHORAX.

Hæmothorax is frequently seen. The physical signs are those of fluid—viz., impaired movement, impaired or absent entry of air, dull note, diminished voice sounds, and displacement of the heart. Once I have seen a large effusion of blood in the wall of the chest around the entrance wound, and in one case there was a considerable degree of subcutaneous emphysema around the wound; this gradually disappeared in a few days. From the physical signs above it would be impossible to tell these cases from ordinary pleuritic effusion; we only judge that the fluid in the chest is blood from the history of the wound. In one patient in whom we decided that the amount of fluid necessitated aspiration we were surprised to find only clear fluid without any blood; it was evident that the wound had led to a pleuritic effusion, not a hæmothorax.

You might think that pyrexia would not be present with a hæmothorax, but you must remember that pyrexia is quite common with a hæmothorax, the cause being in many cases infection of the clot and fluid, and in many others no doubt rapid absorption of altered blood from the extensive pleural surfaces. Pyrexia does not always mean microbic infection of the effused blood, for the patient's illness often does not suggest a general infection, and he gets perfectly well without removing any of the fluid from the chest by aspiration or laying it open. The temperature in the cases in which there is no evidence of infection of the effused fluid may be normal, but may be raised for any time from a few days to a few weeks. Commonly it is about 99° F. in the morning and 100° or 101° in the evening, and the chart is very regular, often remaining at the same height every evening for some time. Gradually both morning and evening temperatures decline for some days until normal is attained.

This pyrexia has often led to an erroneous diagnosis of pus. This was so in the case of a civilian accidentally shot with a revolver whom I saw recently. The matter can always be settled by a bacteriological examination of some of the fluid removed by an exploring needle. After a bullet wound of the chest leading to hæmothorax, microbic infection of the contents of the pleura should be suspected when the evening temperature is high and the daily excursion wide; the general symptoms are more severe than they are in cases of a sterile

hæmothorax, and a leucocytosis may be a guide. The amount of pus or the odour of the fluid removed with an exploring needle will often settle the diagnosis, but a bacteriological examination may be necessary. An empyema has occurred in about 10 per cent. of my cases, but other collections made abroad give, I believe, a higher percentage, for naturally cases severely ill would not be sent over here quickly.

Aspiration.

In the greater number of instances of hæmothorax seen in this country it is quite unnecessary to put a needle in the chest; the diagnosis can be made without this. Many of the patients get quite well without aspiration and without any medicinal treatment, but the physical signs return to normal much more slowly than with an ordinary pleuritic effusion. This is what we should expect, for it is only likely that altered fluid blood and clot, if any forms, are reabsorbed more slowly than clear fluid.

When the amount of blood in the chest is considerable it should be removed by aspiration, but this should be done slowly with only a moderate diminution of pressure in the exhaust bottle. In one case which I saw there was strong reason to suspect that too rapid emptying of the chest led to a pneumothorax from the tearing open of the wound in the lung. The removal of some—say half—of the fluid in the chest may accelerate the absorption of the rest, but it is usually wise to take away as much as possible. After aspiration of blood there is no reaccumulation of fluid. In forming an opinion as to whether to aspirate we pay attention to the degree of displacement of the heart and the extent of the physical signs. Hitherto I have not withdrawn the blood unless the heart is well displaced, and the physical signs are those of a large amount of fluid reaching as high as the spine or even the top of the scapula. Physical signs, however, are an uncertain guide to the amount of fluid, for it is impossible to estimate the degree to which the lung is compressed.

As a matter of fact, in all my cases which have been aspirated the amount of bloody fluid withdrawn has been 40 fl. oz. or over; the largest amount has been 80 fl. oz. The fluid, if sterile, has always been of the dark chocolate colour of altered blood. It is very doubtful whether it is pure blood, for a bleeding of 80 fl. oz. of pure blood into the pleural cavity would probably kill the patient outright, and not one of the patients I have seen has by the time he has reached this country had the appearance of a person who has lost a very large quantity of blood, yet we know that a patient who has had, say, a severe post-partum hæmorrhage or a severe hæmatemesis will look pale even a month later. These facts suggest that bleeding into the pleural cavity leads to the effusion from the pleural surface of clear fluid, and hence the very large quantity that may be removed on aspiration. In connexion with this you will remember that one case has already been mentioned in which we expected blood, but found only clear fluid.

Effects of Aspiration.

Although the physical signs over the lung change after aspiration, as they do when clear fluid is aspirated, yet I think they do not alter as rapidly—for example, dullness remains longer after the withdrawal of this bloody fluid than after the withdrawal of the same amount of clear fluid, and it is quite certain that the displaced heart does not return at once to its normal position. Immediately after the removal of the bloody fluid the impulse of the heart is in much the same position as before aspiration, and it is many days, or even a few weeks, before it reaches its proper place. Perhaps this is because the heart is held out of place by blood clots, which may also explain the persistence of physical signs for longer than after the removal of an ordinary pleuritic effusion, but the persistence in hæmothorax is partly due to the same causes as is the persistence after removal of clear fluid—e.g., the slow expansion of the collapsed lung. That the presence of blood clots explains the long while that elapses before the physical signs disappear and the heart returns is only a suggestion. I have no post-mortem evidence of this, and the effects of a large sudden bleeding into the pleural cavity would well repay experimental investigation.

I have been so impressed with how well cases of hæmothorax do when left alone, the blood being slowly absorbed, that probably I have erred on the side of not aspirating enough of them, and it may be that it would lead to more rapid recovery if all in whom the fluid was over 20 fl. oz. were aspirated. At the beginning of the war we were all feeling our way in the treatment of conditions rarely seen in civil life. Anyhow it is probably wrong to withdraw the fluid shortly after the injury. This might lead to fresh bleeding and to the reopening of the wound in the lung, which in its turn might cause a hæmopneumothorax or a pyopneumothorax. We shall learn from those who see these cases abroad as to how soon it is wise to withdraw the fluid. This, however, is certain, that if after considering all the points here mentioned, and remembering that the less severe cases get perfectly well if left alone, it is decided to withdraw the fluid, do not delay too long, for a lung that is compressed for some time takes a long time to re-expand.

FRACTURE OF RIBS AND OTHER RESULTS.

In very few of the patients with bullet wounds of the chest that I have seen has the bullet struck a rib and run round it; probably the modern bullet has too high a velocity for this. The bullet is small enough to go through the intercostal spaces without hitting a rib. Generally there is no fracture of the ribs, and when it occurs except for the pain it does not seem to matter, but the pain is occasionally troublesome. There has been among my series no case of dangerous external hæmorrhage from the wound. Whether, in any given case, the hæmothorax is due to hæmorrhage from damage to an intercostal artery or to bleeding from the lung there is during life no evidence to show. Considering that the bullet has traversed the clothes it is surprising how often the wounds are clean. Commonly they heal up at once, and indeed many are quite healed by the time we over here see them.

It is remarkable that in cases of hæmothorax air is very rarely present in the pleural cavity. Only twice has it been found in my cases. Once, as already mentioned, it followed aspiration; in this instance it was absorbed without any ill-defects. In the other the patient was admitted with signs of fluid and air in his pleural cavity; he was very ill with high fever. The chest was opened by removing a piece of rib, and a huge quantity of dirty blood-stained fluid escaped which contained a pure culture of the influenza bacillus, showing that it had been infected from the lung. The operation improved his general condition a little, but he continued very ill with high fever for many weeks; ultimately he got quite well. He was the worst

case under my care, and out of about 50 I have seen none have died.

PROGNOSIS.

The outlook for these patients is good, and here are a few instances to illustrate this.

A middle-aged officer was hit by a bullet which entered the left sixth space behind 3 inches from the spine, and came out in the second left space 1 inch from the sternum. There were signs of a considerable hæmothorax, which was not aspirated. I saw him eight months after he was wounded. He was breathing well and said that last week he shot three days and played golf on a fourth. He has been doing light duty for two and a half months. All that can be detected wrong is that in the immediate neighbourhood of the entrance wound the entry of air is somewhat impaired; otherwise the damaged chest is perfectly healthy and similar to the sound side.

In another officer of about the same age a shrapnel bullet entered the chest 1 inch to the right of the lower end of the sternum. X rays showed it to be embedded in the lower part of the right lung. He had signs of a moderate hæmothorax; he was not aspirated. Six weeks after the wound he was passed as fit for general service and left for Flanders a week later. Six months later he writes to me saying: "I have had no medical advice, no symptoms or trouble of any description. I have been leading my ordinary life since I returned to this country, walking, riding, &c., and am able to carry on just the same as before I was wounded. I still have the bullet in me as a souvenir."

The next, a younger man, was hit by a bullet which entered the back 1 inch above the right posterior superior spine and came out in the right axilla. Two pints of bloody fluid were aspirated, and when he left the hospital the right chest was flattened, it moved badly, the air entry was poor, and there was considerable dullness. He went into the country, and six months after he was wounded he was passed as fit for active service. He returned to Flanders and wrote a few weeks later to say he was quite well and at work in the trenches. Before he left England he was able to "go up hills easily in a long day's shooting."

A man, aged about 40, was hit by a bullet which entered the chest in the right anterior axillary fold and passed out behind through the eighth right space. He had signs of a moderate degree of hæmothorax, which was not aspirated. Six months after he was wounded he was passed fit for active service and returned to Flanders. After he had been there a month he wrote home that he had been very much in the thick of it and felt "right enough." Another officer was hit by a bullet which entered the left posterior axillary fold and embedded itself in the ninth dorsal vertebra, from which it was removed by Mr. J. Sherren. He had signs of a left hæmothorax. An exploring needle revealed only bloody fluid, the needle being put in to make quite certain there was not an empyema. No aspiration was done. I saw him seven months later and found that, except that the voice sounds in the left lung were slightly diminished, the left chest was perfectly healthy and quite like the right.

This case is of great interest. In an officer, aged 33, the bullet entered 1 inch above and a little to the right of the right nipple, and passed out nearly in the middle line close to the twelfth dorsal spine. Twelve days later 78 fl. oz. of bloody fluid were aspirated. He had some fever, but it left him soon after aspiration. At no time had he any signs of a re-collection of fluid, but there were very evident signs of pulmonary collapse, with falling in of the right side of the chest and drooping of the right shoulder. Three months after the injury he could walk three miles. A month later he could play a round of golf, and as a result of diligent breathing exercises the falling in of the chest and drooping of the shoulder were less; the lung was expanding much better and appeared healthy. He would probably have recovered faster but that he always seemed afraid to move the right chest.

An officer had a considerable hæmothorax on the right side as the result of a bullet which entered the second right space in the front fracturing the third rib, and it passed out in the sixth space behind. There was pyrexia; the hæmothorax was aspirated. Seven months after he was wounded he writes: "I only feel my lung when I yawn or breathe very deeply, and I am able to play racquets."

The next is a severe case. A major was hit by a bullet which, passing in at the right anterior axillary fold, passed out just to the right of the middle line at the level of the eighth rib. He had severe hæmoptysis and a large hæmothorax; 60 fl. oz. of bloody fluid were aspirated. Six weeks after he was wounded he left the hospital, and two months later was able to walk a "good many miles." Five months after his wound he was passed as fit for home service, and a month later as fit for general service. He complained that he still got out of breath climbing hills and walking fast; still, after all, most of us do that.

Of the few cases of empyema after a bullet wound of the chest one was passed as fit for home service nine months after he was wounded. At that time he wrote to me to say: "I feel practically all right now." His was a troublesome empyema, and a second operation was necessary to drain it properly. It is interesting to notice that this patient thinks walking far superior to breathing exercises as a means of re-expanding the lung.

The following is of great interest. A man of about 35 was wounded by a bullet which entered through the middle of the sternum at the level of the fifth rib and passed out through the fifth right space 2 inches posterior to the posterior axillary line. Except for a large hæmothorax no harm appears to have resulted. Seven days after he was wounded I aspirated 56 fl. oz. of bloody fluid. His physical signs and general condition improved rapidly. Five months after his wound he was passed as fit for light duty, but he writes that even then "I feel quite fit as long as I don't do too much, but I still feel a certain tightness across my chest and an occasional catching of my breath."

The last case seen shows how well they may do. Four or five pieces of shrapnel entered the right chest of an officer, aged 18, on Sept. 25th last. About three weeks later 80 fl. oz. of bloody fluid were removed from the chest. Three weeks afterwards I saw him. His temperature was normal and the entry of air into the right chest was somewhat impaired. Still, he was using the right lung quite well and seemed to get more air into it each day.

Bullet Embedded in Lung.—Perforation of Diaphragm.

Although we have had several cases, some without signs of hæmothorax, in which a bullet has been embedded in the lung we have had no case of

abscess in the lung. In every case the bullet has been left alone, and in no instance has its presence done any harm. One officer who was hit at 4 A.M. had no hæmoptysis and went on working for eight hours digging hard after he was hit. The X rays showed the bullet in the base of the right lung. Recently an officer who had a bullet in the base of the right lung was admitted very ill with a temperature between 103° and 104°F. Except that there were no physical signs to indicate pneumonia the case behaved exactly like a pneumonia, the temperature falling suddenly by crisis, after which he was perfectly well.

The following shows how little harm a bullet in the lung may do. A colonel was hit by a bullet which passed through the sternum ¼ inch below the level of the nipple, and was located by the X rays in the middle of the right lung behind the nipple. There was a slight hæmothorax which was not needled. He returned to work in France six weeks after his wound. I saw him a year later. He had been perfectly well ever since, working 14 hours a day, was not conscious of any dyspnœa, but the air entry was not quite so good on the right as the left. The bullet is still in the lung.

Occasionally the diaphragm has been perforated. I have mentioned some examples already. In another the bullet entered the abdomen just below the xiphoid cartilage, slightly to its left and passed upwards through the right lung. In no case have we been able to discover that the perforation of the diaphragm mattered. In one case a bullet lay just outside the pericardium, so close to it as to move synchronously with the heart. In another the bullet lay in the pericardium, but bullet wounds of the heart and pericardium would need a separate lecture. One patient told us that he had suppression of urine after he received a gunshot wound of the chest and for several days he only passed a few ounces, but suppression of urine may occur after any severe shock—for example, it may occur with severe gall-stone colic.

TREATMENT.

We in this country have no opportunity of treating these patients shortly after the wound, so I cannot give you illustrative cases. The chief danger arises from hæmorrhage, either hæmoptysis or hæmothorax. Therefore, after moving him gently you will keep the patient at rest in bed, give him for a time no food and but little to drink, and sufficient morphia to keep him quiet and to diminish the respiratory movements without endangering his life. If he has a hæmothorax which the general signs or the examination of the fluid removed with an exploring needle show to be infected with micro-organisms, a piece of rib should be removed and the pleural cavity drained as soon as possible.

We have already discussed the question of aspiration of sterile hæmothorax; but whether the fluid is removed by incision or aspiration or whether it is left to be absorbed, remember that fluid in the chest always means compression of the lung, and you must as soon as possible exercise the patient so as to re-expand the compressed lung. As we cannot see the wound in the lung we cannot tell when it is healed. Probably in such a vascular organ the wound heals quickly, and if neither hæmoptysis nor hæmothorax has been severe I have often directed the patient to take deep breaths several times a day three or four weeks after the infliction of the wound. In patients who are severely damaged great good can, as I have often seen, be done by the breathing exercises recommended by Mr. C. MacMahon in THE LANCET of Oct. 2nd, 1915.

When he is well enough to be up the patient should be told to take short walks, increasing the distance each day; and he may walk gently up hills, increasing gradually the distance he goes and the steepness of the hills. Some say they do better with breathing exercises; others, perhaps the majority, find that walking and gradual ascent of hills are best. But whatever means you adopt you must impress upon them the great importance of expanding the affected lung. Occasionally the patient seems to dread moving the affected side; for such, breathing exercises are best.

Since I put this lecture together I have read an article on Hæmothorax by Sir John Rose Bradford and Dr. T. R. Elliott.[2] I should advise you to read it, for my lecture is founded on experience gained in this country. They, working at Boulogne, have seen their patients earlier and their cases have been more severe, but the conclusions at which we have arrived are fundamentally the same.

UREA AS A BACTERICIDE, AND ITS APPLICATION IN THE TREATMENT OF WOUNDS.

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I.—*Laboratory Notes by* Professor SYMMERS.

SOME years ago, while working with meningococci, I observed a phenomenon which was new to me. Suspensions of living meningococci were added to 5 per cent. suspensions of blood corpuscles. The mixture of cocci and blood was then placed in an incubator (37° C.), and after 15 minutes it was seen that the blood had darkened, had become venous in tint. This change of colour, as proved spectroscopically, was due to the reduction of the oxyhæmoglobin. In the next place, this reduction did not occur if the cocci were killed (60° C. for one hour) before being added to the blood suspension.

A large number of tests showed that the living cocci, and also living bacilli of various species, possess the power of removing oxygen from the oxyhæmoglobin of the red cells. The phenomenon can also be demonstrated when laked blood is used, the dissolved hæmoglobin being still capable of combining with, and of being deprived of, oxygen. Incidentally, I observed that bacteria when suspended in certain solutions of urea lost completely this deoxidising power. In other words, the urea appeared to be bactericidal, and therefore the bacteria were no longer able to reduce the oxyhæmoglobin.

It was now a simple matter to determine whether the urea was, or was not, a bactericidal substance, and a number of tests showed that urea readily kills non-sporing bacteria. In the first place it was shown that urea kills such germs when these are suspended in water—e.g., the whole of a 24 hours old agar culture of bacillus typhosus was suspended in 2 c.c. of water; this was then saturated with dry urea, and after standing at room temperature for

[2] British Journal of Surgery, October, 1915, p. 247.

half an hour agar tubes were inoculated from the mixture, the result being that no growth appeared on the agar tubes.

Again, a more severe test was applied—viz., does urea kill the germs in a medium such as tuberculous sputum? The following are examples:—Old putrid tuberculous sputum gave on ordinary agar tubes a confluent mass of growth of various bacteria. This sputum was then saturated with urea at the room temperature, and after 15 minutes a loopful was smeared on agar tubes, the result being that only three colonies developed, and when the ureated sputum was planted out after 30 minutes only one colony appeared on the agar tube, thus contrasting markedly with the control tube which, as above stated, was covered by a confluent mass of growth in which the colonies were too numerous to be counted. Again, often from such sputum, after the urea had acted for from half an hour to one hour, no growth at all could be obtained, the sputum being apparently completely sterilised.

From such observations the question naturally arose, Will urea kill bacteria in the presence of blood and such-like albuminous material? Perhaps I may be content with reporting a few tests regarding this very essential point. In one test 5 c.c. of blood were inoculated with ½ c.c. of a 24 hours old culture of bacillus pyocyaneus (an agar culture suspended in 2 c.c. salt solution), a loopful of the infected blood being planted out as a control. Then to the infected blood were added 5 grm. of urea, the solution of the urea being assisted by immersing the mixture in hot water (37° C.) for a few minutes; then the mixture was left at room temperature for 20 minutes, after which loopfuls were transferred to agar tubes. No growth appeared. The same absence of growth was noted when the loopfuls were placed in broth tubes, it being apparent that the amount of urea carried over in the loop was not sufficient to act as an inhibitor of growth. The control in this case gave an abundant confluent growth on the agar.

Another test was as follows. 5 c.c. of blood were measured into a test-tube, then one drop of pyocyaneus suspension was added, then 5 grm. of urea. The control gave a copious confluent growth. Loopfuls of the ureated mixture were planted on agar, beginning 5 minutes after adding the urea, then after 10, 15, and 20 minutes. The result was that the 5 minutes' tube (after 24 hours' incubation) showed 41 colonies of pyocyaneus, the 10 minutes' tube showed 11, the 15 minutes' tube 2, and the 20 minutes' tube 1. When two hours had passed loopfuls planted out gave no growth at all. (See table.)

5 c.c. blood, 1 drop pyocyaneus suspension, 5 grm. urea.

Transfer loopful to agar—	After 24 hours at 37° C.
After 5 minutes	41 colonies grew.
,, 10 ,, ...	11 ,, ,,
,, 15 ,, ...	2 ,, ,,
,, 2 hours	0 ,, ,,

The pyocyaneus suspension was composed of a 24 hours agar culture suspended in 2 c.c. of water. The "drop" was roughly 1/15th of a cubic centimetre. The control—a loopful taken from the infected blood just before adding the urea—gave a copious confluent growth. This table is taken from my earlier notes; as a rule, 30 minutes is sufficient to ensure the destruction of non-spore-bearing bacteria.

Again, a similar quantity of blood (5 c.c.) was inoculated with pyocyaneus, but only 2½ grm. of urea were added. After half an hour standing at room temperature no growth could be obtained on agar or in broth, whereas the control was covered by the usual confluent growth. Again, still using 5 c.c. of blood infected with pyocyaneus, a smaller quantity of urea was added—viz., 1·25 grm. (equal to 25 per cent. urea); the result was that after 15 minutes' contact with the urea the agar tube then implanted showed 98 colonies, and after 30 minutes 5 colonies grew, as against a confluent multitude on the control tube. Below this concentration (25 per cent.) urea has no decided bactericidal effect, so far as I am aware, but still the lower dilutions have a marked inhibitory influence on the growth of bacteria. This last statement is borne out by the work of Dr. W. James Wilson,[1] who found that when 8 per cent. of urea was present in the media there was practically no growth of B. coli, and that still lower percentages (1·5–3·5 per cent.) caused a number of organisms to assume remarkable pleomorphic forms, comparable to the results obtained by Charrin[2] when various antiseptics in low percentages were added to the culture media.

Thus in urea we have a substance which in the dry state is permanently stable, which is practically non-poisonous, which is highly diffusible, and which even in low concentration (3 per cent.) affects the growth of bacteria, is inhibitive to growth at about 8 to 10 per cent., and which is markedly bactericidal to non-sporing bacteria in the higher percentages. This bactericidal effect is active in the presence of blood and such like organic fluids. Moreover, as will abundantly appear in Mr. Kirk's remarks, urea is non-irritating to living tissues, the dry substance may be sprinkled over wounds to almost any extent without any injury to the parts.

II.—*Clinical Notes by* Mr. KIRK.

During the last four years we have been using urea clinically. At first we used it in fresh 100 per cent. watery solution. The only cases in which this gave results of undoubted value were those of diphtheria carriers, in which it was used as a wash. Its value in these cases is now firmly established here. In surgical cases we never got really good results until the urea was used in the solid form, and used very liberally; and the solution of it in the blood or serum in the wounds kept closely in contact with the tissues, either by closing the wound with continuous sutures or covering it with some protective material such as oil silk in order to prevent drainage. Dry dressings on the top of the urea absorbed the solution and prevented its action on the tissues.

We have used urea in various surgical cases whether infected or not in order to determine its action on the animal tissues as well as on the bacteria, and we find that it is entirely innocuous to the living animal tissues, even when used in large quantities in the solid form. We have proved this by using it: 1. On Thiersch's epithelial skin grafts on healthy ulcers it has never caused any necrosis of the grafts. 2. In a case of oblique simple fracture of the shaft of the femur in a young man 1½ drachms of solid urea was placed beside the fracture after it had been plated, and the muscles, fascia lata, fascia and fat, and skin were closed in layers with continuous sutures so as not to allow of any drainage. There was no sign of any interference with healing, and in three weeks massage and passive movements were commenced and all dressings and splints discarded. 3. In many cases of radical cure for inguinal hernia urea has been placed between the different layers of tissue

[1] Journal of Pathology and Bacteriology, January, 1907.
[2] Charrin: La Maladie Pyocyanique, Paris, 1889.

without doing any damage thereto. These three classes of cases have demonstrated beyond doubt that urea has no harmful action on living animal tissues.

In one case of radical cure for hernia in a man with a chronic staphylococcic blood infection the urea was sprinkled between the layers of tissue, and these layers were closed with continuous sutures so as to prevent all drainage. This wound healed without any sign of infection. This is a class of case in which blood infection in the wound may reasonably be expected. Its action on infected tissues is best exemplified by quoting some typical cases.

CASE 1.—Sergeant ——, admitted to the Ulster Volunteer Force Hospital on account of partial ankylosis of the left knee due to suppurative arthritis after a shell wound received in France. He had a sinus in front of the lateral condyle of the femur, leading into a cavity about the size of a hen's egg. The discharge from this cavity when planted on agar gave a profuse mixed growth of micro-organisms. Past experience taught us never to attempt immediate excision of the joint in such cases, as general infection of the wound was certain to occur. In this case the joint was excised immediately, and the patella, after having its articular surface removed, was sutured to the front of the tibia after removal of the tubercle. The abscess cavity was scraped. No special precautions were taken to prevent the pus soiling gloves, instruments, or the rest of the wound. Before closure the wound was well dusted with solid urea, and about 1½ drachms of it was placed in the abscess cavity. The skin wound was closed with a continuous subcuticular suture; half an inch of the incision, which was across the front of the joint, was left unsutured at each end. The wound was dressed twice in the first 12 days, and union has taken place without the slightest infection.

CASE 2.—Private ——, admitted to the Ulster Volunteer Force Hospital. On Oct. 24th, 1915, a large crepitating abscess over the sacrum was opened; three pieces of metal were removed, and a quantity of gas-containing pus was liberated. The cavity was scraped, solid urea was put into it, and the skin closed with a continuous silkworm-gut suture without any drainage. Union by first intention took place. The pus was planted out on agar, and a gas-producing micro-organism grew copiously.

CASE 3.—A child, aged 5 years, a patient in the Belfast Hospital for Sick Children. Admitted with acute osteomyelitis of the left femur and tibia, with large abscesses. These were opened on Oct. 14th, and the pus sponged out. Urea was then placed in the cavities, and the wounds covered with protective tissue to prevent drainage. They were dressed for the first time on the 16th, and no pus could be forced out of either cavity. The temperature in the meantime remained normal. Since then they have been dressed every other day and sequestra have separated. On the 18th she had developed an abscess in the soft tissues near the front end of the left first rib. The skin over this abscess was inflamed. On that day this abscess was opened, sponged out, and filled with urea, and then, in spite of the skin inflammation, it was closed with a continuous suture. This wound was dressed after 48 hours. The redness of the skin had gone and there was no swelling. In order to ascertain what was under the skin, one end of the wound was opened, but nothing could be got; the wound was then made to bleed a little and this blood was planted out, and from it a pure but moderate growth of staphylococcus pyogenes aureus was obtained, the same organism that was got from the thigh and leg and also from the chest abscess when it was first opened. This chest wound has since healed soundly.

Since Oct. 4th all the wounded soldiers under our care in the Ulster Volunteer Force Hospital have been treated with urea, and it has been found that sloughing infected wounds dressed with urea once in 24 hours give better results than similar cases treated in any other way.

What strikes one in watching wounds treated with urea under protective tissue is the absence of the venous congestion of the tissues that occurs in cases treated with ordinary wet dressings, continuous irrigation, or frequent baths. The circulation in the tissues is normal, and repair seems to be much more rapid than under the conditions produced by fomentations, &c. There is also no irritation of the skin. The drawbacks to its use are that in some cases it produces a considerable amount of pain, which can be met by the administration of morphia, and in the fact that urea absorbs moisture somewhat quickly and becomes caked; this can be prevented by exposing it as little as possible to the air. We have found that it can be carried for a long time in envelopes made of protective tissue, and put up in this way it could easily be adapted as a first-aid dressing for use in the firing-line.

When the Ulster Volunteer Force Hospital was accepted by the War Office it was stipulated that one fully trained nurse should be provided for every 20 patients, but since using urea as a routine dressing it has been found that most wounds require to be dressed only once in 48 hours, and as a consequence we have been justified in asking to be allowed to reduce the number of our trained nurses.

Conclusions.

1. From our laboratory and clinical tests we conclude that urea as an antiseptic acts in the presence of blood. 2. That it is innocuous to animal tissues. 3. That in the quantities that can be used in wounds it is non-toxic. 4. That by its use at least half the labour necessitated by other methods of treatment is saved. 5. That during its use the processes of repair are not retarded. 6. We believe that the most striking results will be obtained by its use as a first-aid dressing. 7. It prevents suppuration arising in wounds from chronic blood infections.

PERFORATION OF GASTRIC AND DUODENAL ULCERS:

A SERIES OF 40 CASES.

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THE cases on which this paper is based have been under my care at the London Hospital during the last six years.

General Statistics.

Of these 40 cases 29 were men, 11 women; all were subjected to operation, and 26 survived—i.e., the mortality was 35 per cent. A notable feature was the excessive mortality of the gastric compared with the duodenal ulcers: of 13 cases of gastric ulcer, 7 patients died—a mortality of 54 per cent.; while of 27 cases of duodenal and pyloric ulcers only 7 patients succumbed—a death-rate of about 25 per cent.

Sex and Age.

Of the 11 women 9 were sufferers from gastric ulcer, of whom 5 died; the 2 female subjects of duodenal ulcer both survived. Of the 29 men 25 were cases of duodenal ulcer, and of these 7 died; of the 4 male gastric ulcer patients 2 died. The range of age was tolerably wide. The youngest gastric ulcer patient was a female aged 17 years; the youngest subject of duodenal ulcer a male aged 22. The eldest gastric ulcer patient was 54; the eldest duodenal ulcer patient 59. The relation of age to prognosis is not striking, except that it

is better with the younger gastric ulcer patients, while middle-aged duodenal ulcer patients did as well as younger persons, as the following table shows:—

Age in decades.	Gastric ulcer patients. Lived.	Gastric ulcer patients. Died.	Duodenal ulcer patients. Lived.	Duodenal ulcer patients. Died.
15–25	3	1	2	0
25–35	1	2	5	4
35–45	1	2	5	0
45–55	1	2	5	3
55–65	0	0	2	0

Situation of Ulcers.

Ulcers tend to perforate in an area of election, which extends from the pylorus, or about a quarter of an inch on the gastric side of this, to about one inch down the duodenum. They are usually on the anterior surface, though we have found them occasionally at the junction of the first and second parts of the duodenum where the latter is attached to the posterior abdominal wall (a very awkward position to close by suture). It is not easy to decide at operation whether the ulcer is at or just beyond the pylorus, and therefore it seems reasonable to class the pyloric gastric ulcers with the duodenal ulcers, especially as the results are very similar. In this series four ulcers were noted as pyloric; all of the patients survived, agreeing in this respect with the more benign duodenal ulcer.

Types of Ulcer.

Every ulcer which perforates is acute in the sense that it is progressive, and one invariably finds an area of inflammatory œdema surrounding the perforation. This hard œdematous area varies in size from that of a shilling to that of the palm of the hand. It is not always easy to decide during an operation, in which speed is conducive to success, whether an ulcer is of old standing or recent origin; sometimes the œdema around a recent ulcer will give it an appearance very similar to the large, hard, chronic ulcers of months' or years' duration. Taking the history and operative findings as criteria, it appears that all the gastric ulcers were chronic, while of 24 duodenal ulcers in which history was obtained 17 were chronic as regards history, and of these 6 died; 7 were acute cases, of which one proved fatal.

Diagnosis.

With regard to diagnosis, it will suffice to touch on a few points only.

The *onset* is in most cases sudden, though it sometimes happens that it is not possible to determine at what hour the pain of dyspepsia alters to that of peritonitis.

Vomiting is not a striking feature of the picture, though it occurs in most cases at some period of the attack, usually the commencement; it was noted in 17 cases, and stated to have been absent in only 3. Where severe and continuous, vomiting is a sign of grave omen.

Rigidity is the cardinal sign and is more marked than in any other condition except rupture or perforation of other hollow viscus—e.g., the intestine. The tenseness of the retracted abdomen is characteristic and continuous; at least we have not yet seen cases where it passes off for a time. A considerable rigidity is, however, sometimes present when sudden leakage from an encysted intraperitoneal abscess (e.g., of appendical origin) has taken place. For this reason it is always advisable to explore the appendix first; since some cases of appendicitis present themselves with little in the way of signs except dyspepsia, and if after two or three weeks an abscess should form and burst the resulting peritonitis is easily mistaken for that resulting from perforation of a gastric or duodenal ulcer. The appendix can readily be explored and one can be sure within five minutes as to whether or not it is the initial cause of the peritonitis. On the other hand, exploring in the lymph around a distended stomach for a perforation which does not exist, wastes much valuable time and reduces the patient's prospects to a minimum.

Prognosis.

This turns essentially on the condition of the patient at the time when operation is undertaken, and the most concrete sign of good or bad condition is the *pulse-rate*. The pulse-rate, however, does not appear to be of serious importance unless it is over 120, while several cases in which it was under 90 failed to recover. The slow pulse-rate in one or more of these cases was due to the patient being under the influence of morphia. The relation of pulse-rate to mortality is shown in the following table:—

Pulse-rate.	Number of patients who lived.	Number of patients who died.
70–90	9	4
90–120	10	3
120–150	2	6

The mortality bears a pretty definite relation to the *time which elapses between perforation and operation*. After 12 hours the prognosis becomes grave, yet cases have survived where perforation has apparently been present for two days or more, while occasionally in cases where the perforation has been present for as short a time as four hours the patients have died, as shown in the following table:—

Hours after perforation at which the operation took place.	Gastric ulcer patients. Lived.	Gastric ulcer patients. Died.	Duodenal ulcer patients. Lived.	Duodenal ulcer patients. Died.
0–12	4	2	11	1
12–24	1	2	4	2
24–48	0	2	1	3
48–72	1	0	1	1

The surviving cases in the last line of the table, supposed to have been perforated for three days, are possibly the result of the difficulty in deciding the exact time at which perforation took place.

Liver dullness.—This condition was absent in 10 cases, present in 7, and is a useful subsidiary sign when present with a rigid, retracted abdomen. If the abdomen is distended, loss of liver dullness does not necessarily imply that there is free gas in the peritoneum, since it occurs with distension of the intestines.

Treatment.

Operative measures should be undertaken at the earliest possible moment, unless the patient is obviously moribund. As regards anæsthesia, open ether, possibly assisted by occasional breaths of chloroform and preceded by injection of morphia and atropine, is our usual practice. We have occasionally employed intraspinal anæsthesia with stovaine in cases of peritonitis of the upper abdomen, but it is impossible to be certain of obtaining anæsthesia sufficiently high, and consequently general anæsthesia is more suitable.

It is wise to explore the lower abdomen first, lest a fulminating appendicitis be missed. We employ the muscle-splitting (gridiron) incision for this purpose as being most rapid, where speed is of high importance. In any case the lower incision is not wasted, as it serves well to drain the pelvis, which is in most cases advisable. Having pulled up the

appendix and found it void of offence, and at the same time noting possibly the escape of a whiff of gas, and by the colour and odour of the peritoneal exudate that the lesion is of the stomach or duodenum, the latter are exposed by an incision splitting the upper right rectus. The escape of gas and gastric and duodenal contents are now usually obvious. The pylorus is pulled up, as in two cases out of three the perforation is within half an inch of this. If no perforation is found in this neighbourhood, the anterior surface of the stomach is explored manually up to the cardiac orifice, feeling for the induration around the perforated ulcer. Failing to find an ulcer on the anterior surface the stomach is pulled out with the transverse colon, and its posterior surface explored through an incision in the mesocolon.

A perforation is seldom of more than a quarter of an inch in diameter, though occasionally twice as large as this, and can be firmly occluded by the passage of one or two sutures. These sutures should secure a good wide grip through the whole thickness of the organ, since a small grip will easily tear out of the soft œdematous wall. The occluded ulcer should be invaginated where possible by a series of interrupted sutures taking up the serous and muscular coats. Invagination of the ulcer may, however, prove impossible if the ulcer and area of surrounding induration are very large, or in some instances where the ulcer is at the attachment of the duodenum to the posterior wall. In such cases the occluded ulcer is covered with a graft of detached omentum, or drainage is made down to the ulcer with a gauze pack (Corner[1]) in case the preliminary sutures cut out.

One must next consider whether a gastro-jejunostomy should be done. In most cases where the patient is not likely to die shortly we finish with a gastro-jejunostomy, especially where the ulcer is in the vicinity of the pylorus, since if this be done the patient can be fed after operation much more effectively, and there can be little doubt that many of these patients are suffering from malnutrition, the results of previous dyspepsia, which prevents healing taking place readily. This addition does not add greatly to the duration of the operation (the whole procedure from start to finish averages, we find, about 35 minutes) and improves the prospects of ultimate success. In the less usual cases where the ulcer is on the body of the stomach gastro-enterostomy is not so urgently needed, but nevertheless is advisable.

The Uses of Jejunostomy.

Where the patient's condition is extremely grave and every moment spent on the operation is of importance, we advise simply occluding the ulcer with one or two sutures, placing a gauze drain down to the site of perforation, and performing a jejunostomy for the purpose of feeding the patient early. Jejunostomy is performed on the invagination (Kader) principle, takes less than five minutes to perform, and has the advantage that fluid nourishment can be introduced to the most absorbent surface of the intestinal canal, in a situation where vomiting is impossible, and which, unlike the rectum, is unable to reject the proffered refreshment. The actual results of cases treated by this method were less good than were those of cases treated otherwise simply owing to the very grave condition of the patients; 1 recovered and 3 died. One of the latter, which had been perforated three days, lived four days after operation. Another lived 14 days, only succumbing at length to a slowly spreading peritonitis. We only regret that this method was not employed in some of our earlier severe cases which succumbed.

The following table shows the various operations adopted and their results:—

Operation.	Gastric ulcer patients. Lived.	Died.	Duodenal ulcer patients. Lived.	Died.
Suture alone	1	3	2	2
Suture and gastro-jejunostomy ...	4	2	18	4
Suture and jejunostomy	1	2	0	1

My best thanks are due to my house surgeons for their notes on the above cases, and especially to Mr. W. S. Perrin, surgical registrar to the London Hospital, for his care in collecting and collating the histories.

Wimpole-street, W.

[1] THE LANCET, Jan. 10th, 1914, p. 101.

AN INVESTIGATION ON THE NATURE OF ULTRA-MICROSCOPIC VIRUSES.[1]

BY F. W. TWORT, L.R.C.P. LOND., M.R.C.S.

(*From the Laboratories of the Brown Institution, London.*)

DURING the past three years a considerable number of experiments have been carried out at the Brown Institution on filter-passing viruses. Many of these, previous to the outbreak of the war, were performed by Dr. C. C. Twort, and, unfortunately, circumstances during the present year have made it difficult to continue the work.

In the first instance attempts were made to demonstrate the presence of non-pathogenic filter-passing viruses. As is well known, in the case of ordinary bacteria for every pathogenic micro-organism discovered many non-pathogenic varieties of the same type have been found in nature, and it seems highly probable that the same rule will be found to hold good in the case of ultra-microscopic viruses. It is difficult, however, to obtain proof of their existence, as pathogenicity is the only evidence we have at the present time of the presence of an ultra-microscopic virus. On the other hand, it seems probable that if non-pathogenic varieties exist in nature these should be more easily cultivated than the pathogenic varieties; accordingly, attempts to cultivate these from such materials as soil, dung, grass, hay, straw, and water from ponds were made on specially prepared media. Several hundred media were tested. It is impossible to describe all these in detail, but generally agar, egg, or serum was used as a basis, and to these varying quantities of certain chemicals or extracts of fungi, seeds, &c., were added. The material to be tested for viruses was covered with water and incubated at 30° C. or over for varying periods of time, then passed through a Berkefeld filter, and the filtrate inoculated on the different media. In these experiments a few ordinary bacteria, especially sporing types, were often found to pass through the filter; but in no case was it possible to obtain a growth of a true filter-passing virus.

Attempts were also made to infect such animals as rabbits and guinea-pigs by inoculating two doses of the filtered material, or by rubbing this into the shaved skin. In other cases inoculations were made directly from one animal to another in the

[1] This investigation was made on behalf of the Local Government Board.

hope of raising the virulence of any filter-passing virus that might be present. All the experiments, however, were negative.

Experiments were also conducted with vaccinia and with distemper of dogs, but in neither of these diseases was it found possible to isolate a bacterium that would reproduce the disease in animals. Some interesting results, however, were obtained with cultivations from glycerinated calf vaccinia. Inoculated agar tubes, after 24 hours at 37° C., often showed watery-looking areas, and in cultures that grew micrococci it was found that some of these colonies could not be subcultured, but if kept they became glassy and transparent. On examination of these glassy areas nothing but minute granules, staining reddish with Giemsa, could be seen. Further experiments showed that if a colony of the white micrococcus that had started to become transparent was plated out instead of being subcultured as a streak then the micrococci grew, and a pure streak culture from certain of these colonies could be obtained. On the other hand, if the plate cultures (made by inoculating the condensation water of a series of tubes and floating this over the surface of the medium) were left, the colonies, especially in the first dilution, soon started to turn transparent, and the micrococci were replaced by fine granules. This action, unlike an ordinary degenerative process, started from the edge of the colonies, and further experiments showed that when a pure culture of the white or the yellow micrococcus isolated from vaccinia is touched with a small portion of one of the glassy colonies, the growth at the point touched soon starts to become transparent or glassy, and this gradually spreads over the whole growth, sometimes killing out all the micrococci and replacing these by fine granules. Experiments showed that the action is more rapid and complete with vigorous-growing young cultures than with old ones, and there is very little action on dead cultures or on young cultures that have been killed by heating to 60° C. Anaerobia does not favour the action. The transparent material when diluted (one in a million) with water or saline was found to pass the finest porcelain filters (Pasteur-Chamberland F. and B. and Doulton White) with ease, and one drop of the filtrate pipetted over an agar tube was sufficient to make that tube unsuitable for the growth of the micrococcus. That is, if the micrococcus was inoculated down the tube as a streak, this would start to grow, but would soon become dotted with transparent points which would rapidly extend over the whole growth. The number of points from which this starts depends upon the dilution of the transparent material, and in some cases it is so active that the growth is stopped and turned transparent almost directly it starts. This condition or disease of the micrococcus when transmitted to pure cultures of the micrococcus can be conveyed to fresh cultures for an indefinite number of generations; but the transparent material will not grow by itself on any medium. If in an infected tube small areas of micrococci are left, and this usually happens when the micrococcus has grown well before becoming infected, these areas will start to grow again and extend over the transparent portions, which shows that the action of the transparent material is stopped or hindered in an overgrown tube; but it is not dead, for if a minute portion is transferred to another young culture of the micrococcus it soon starts to dissolve up the micrococci again. Although the transparent material shows no evidence of growth when placed on a fresh agar tube without micrococci it will retain its powers of activity for over six months. It also retains its activity when made into an emulsion and heated to 52° C., but when heated to 60° C. for an hour it appears to be destroyed. It has some action, but very much less, on staphylococcus aureus and albus isolated from boils of man, and it appears to have no action on members of the coli group or on streptococci, tubercle bacilli, yeasts, &c. The transparent material was inoculated into various animals and was rubbed into the scratched skin of guinea-pigs, rabbits, a calf, a monkey, and a man; but all the results were negative.

From these results it is difficult to draw definite conclusions. In the first place, we do not know for certain the nature of an ultra-microscopic virus. It may be a minute bacterium that will only grow on living material, or it may be a tiny amœba which, like ordinary amœbæ, thrives on living micro-organisms. On the other hand, it must be remembered that if the living organic world has been slowly built up in accordance with the theories of evolution, then an amœba and a bacterium must be recognised as highly developed organisms in comparison with much more primitive forms which once existed, and probably still exist at the present day. It is quite possible that an ultra-microscopic virus belongs somewhere in this vast field of life more lowly organised than the bacterium or amœba. It may be living protoplasm that forms no definite individuals, or an enzyme with power of growth.

In the vaccinia experiments described above it is clear that the transparent material contains an enzyme, and it is destroyed at 60° C. It also increases in quantity when placed on an agar tube containing micrococci obtained from vaccinia, and this can be carried on indefinitely from generation to generation. If it is part of the micrococcus it must be either a stage in its life-history which will not grow on ordinary media but stimulates fresh cultures of the micrococcus to pass into the same stage, or an enzyme secreted by the micrococcus which leads to its own destruction and the production of more enzyme. The fact that the transparent portion cannot be grown except on the micrococcus makes it impossible to obtain any definite evidence on these points. There is this, however, against the idea of a separate form of life: if the white micrococcus is repeatedly plated out and a pure culture obtained, this may give a good white growth for months when subcultured at intervals on fresh tubes; eventually, however, most pure strains show a transparent spot, and from this the transparent material can be obtained once again. Of course, it may be that the micrococcus was never quite free from the transparent portion, or this may have passed through the cotton-wool plug and contaminated the micrococcus, but it seems much more probable that the material was produced by the micrococcus. Incidentally, this apparent spontaneous production of a self-destroying material which when started increases in quantity might be of interest in connexion with cancers. In any case, whatever explanation is accepted, the possibility of its being an ultra-microscopic virus has not been *definitely* disproved, because we do not know for certain the nature of such a virus. If the transparent portion were a separate virus, it might be vaccinia or it might be some contaminating non-pathogenic ultra-microscopic virus, for it is conceivable that whereas a non-pathogenic variety might grow on micrococci or bacilli, a pathogenic variety might grow only on the animal it infects.

As the animal experiments were negative there is no evidence that it is vaccinia, although such a virus might lose its virulence when grown outside the body. On the other hand, no evidence was obtained that it was a non-pathogenic contaminating ultra-microscopic virus. On the whole it seems probable, though by no means certain, that the active transparent material is produced by the micrococcus, and since it leads to its own destruction and can be transmitted to fresh healthy cultures, it might almost be considered as an acute infectious disease of micrococci.

In view of the results obtained with vaccinia similar experiments were carried out with other material. It will not be necessary to describe all these in detail; it will suffice to note that similar, though not such definite, results were obtained with a micrococcus and a member of the coli-typhoid group of bacilli which were obtained from the intestinal mucous membrane of a dog suffering from acute distemper, and there is some evidence that the difficulty often experienced in isolating certain known pathogenic micro-organisms may be due to the same cause. Experiments carried out with tuberculous pleural fluids and tubercle bacilli gave negative results.

More recently, that is when the investigation of infantile diarrhœa and vomiting was continued during the summer and autumn of this year (1915), similar experiments were carried out with material obtained from the intestinal tract. The general results of this investigation will be published later, and it will be sufficient here to note that after certain difficulties had been overcome it was found that in the upper third of the intestine, which contained numerous bacilli of the typhoid-coli group, some larger bacilli were also present. In some cases they grew in far larger numbers than the coli types of bacteria; but this was only so when precautions were taken to eliminate the action of a dissolving substance which infected the colonies so rapidly that they were dissolved before attaining a size visible to the eye. Here, then, is a similar condition to that found in vaccinia, and the greatest difficulty was experienced in obtaining the bacilli free from the transparent dissolving material, so rapidly was the infection increased and carried from one colony to another. Finally, cultures were obtained by growing the bacilli with certain members of the typhoid-coli group for a few generations and then plating out. From the colonies cultures were obtained on ordinary agar. Some of these cultures being slightly infected with the dissolving material rapidly became transparent and were lost, while a few grew well. The bacillus has several curious characters, and these are now being investigated. It is in no way related to the typhoid-coli group. The relation of this bacillus and the dissolving material to infantile diarrhœa has not yet been determined, but probably it will be found also in cases of dysentery and allied conditions; and I greatly regret that I have not been afforded an opportunity of investigating the dysenteric conditions in the Dardenelles to determine this and other points.

When possible, experiments should be conducted to determine the relative toxicity of cocci and bacilli when free from and when associated with the dissolving material, and vaccines prepared with the transparent material should be tested.

I regret that financial considerations have prevented my carrying these researches to a definite conclusion, but I have indicated the lines along which others more fortunately situated can proceed.

A METHOD OF DROP-MEASURING LIQUIDS AND SUSPENSIONS.

(ROUGH PRACTICAL NOTES.)

BY R. DONALD, B.SC. N.Z., D.P.H. OXF.

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THE following article gives some practical details of a method of measuring liquids in uniform drops of any standard size by means of ordinary simply drawn pipettes quickly and accurately gauged. The apparatus was briefly described in a communication [1] to the Royal Society in 1913. A more detailed account was in preparation when the outbreak of war restricted work to the immediately necessary. Under this category the method has been brought by the increased importance of an accurately quantitative form of the Widal test.

For the measurement of small quantities graduated pipettes have hitherto been largely used. But although the worker proposes to deliver small volumes from a graduated capillary pipette, and although he displaces the liquid column downwards the exact amount proposed, yet nature disposes the outflowing liquid in drops, and if the last portion expelled does not form a complete drop and fall spontaneously at its complete phase, then the incomplete drop clings with more or less pertinacity to the pipette point. Even when allowable, touching the pipette point on the side of the receiving vessel is uncertain [2] in its result.[3]

But just in the very conditions where surface-tension or capillary force hinders us most if we try to work independently of it, there that very force will act in our favour if we give it play. Thus, if instead of difficultly and uncertainly aborting drops at various phases of their formation-cycle we allow the rhythmic delivery of mature drops, those drops will be of wonderfully uniform size. Indeed, for delivering successive small equal quantities drop-measuring is superior in quickness and in accuracy to any other method. And the smaller the quantities concerned the greater is this superiority. This may have been more or less generally admitted. The problem hitherto has been how to get easily a supply of reliably uniform pipettes. That problem may be solved very simply.[4]

[1] Also various published articles have dealt with some applications of the method:—Donald, R.: Proceedings of the Royal Society, B, vol. lxxxvi., 1913, pp. 198–202. Idem: A Comparison (of two Wassermann methods), THE LANCET, June 29th, 1912, p. 1752. Idem: A Method of Counting Bacteria in Water, THE LANCET, May 24th, 1913, p. 1447. McIntosh, J., and Fildes, P.: The Wassermann Reaction and its Applications to Neurology, Brain, vol. xxxvi., November, 1913, pp. 213, 227. Benians, T. H. C.: The Resistance of Various Bacteria to the Disinfecting Action of Toluol, &c., Zeitschrift für Chemotherapie, Or., ii., 1913, p. 32. Donald, R.: A Method of Estimating Numerically and Qualitatively the Cells in Permanent Preparations of Cerebro-spinal Fluid, Folia Hæmatologica, Or., B, vol. xvii., 1913, pp. 139–166. Harrison, Major L. W.: Wassermann Test, Technique, Journal of the Royal Army Medical Corps, vol. xxii., 1914, p. 615. Donald, R.: Drop-methods of Counting the Cells of Cerebro-spinal Fluid; the Relation of the Cell-count to the Wassermann Reaction, Review of Neurology and Psychiatry, August, 1914, pp. 333–369. Head, H., and Fearnsides, E. G.: The Clinical Aspects of Syphilis of the Nervous System in the Light of the Wassermann Reaction and Treatment with Neosalvarsan, Brain, vol. xxxvii., September, 1914, p. 2.

[2] Even greater uncertainty may be found in (1) the amount removed and in (2) the amount delivered as a "loopful" of liquid taken by a platinum loop—usually for qualitative but sometimes for quantitative purposes.

[3] For *delivering* an exact amount of a non-wetting liquid such as mercury, Wright's ingenious capillary 5 c.mm. pipette is excellent. Also for measuring, without delivering, the quantity *contained*, capillary pipettes, such as Wright's multiple dilution pipettes and the hæmocytometer pipette, have not the weakness above mentioned. Even this weakness may be overcome by the skill and care of an experienced worker. As regards the hæmocytometer pipette, its 101 mark ought to be not below the narrowest point of the narrowed bo e, as the upper meniscus is vigorously drawn up to that point by capillary force.

[4] This brief article omits the extensive bibliography of the subject and the discussion of the physical phenomena connected with drop-formation.

This method of drop-measuring depends on the fact that the size of a drop of a given liquid yielded by a clean pipette is determined by the outer circumference of the pipette at the level where the contact edge of the drop clings round the glass, the pipette being held vertical or nearly so, and due allowance being made for the rate at which the drop is detached and for the temperature.

The simple process of gauging calibrates quickly and efficiently ordinary pipettes drawn from glass-tubing. Thus the difficulty of getting a pipette quickly and thoroughly cleaned after use is obviated by the simple plan of taking a fresh clean pipette from the easily replenished stock. The size of drops producible by this method varies from 1/200 c.c. or less up to the maximum drop possible for watery solutions—namely, nearly 1/4 c.c.

The tubing for making the pipettes ought, of course, to be such as can be most quickly worked up—that is to say, it ought to be the smallest that will allow the capacity of pipette for the work concerned. Thus, for doing the Wassermann reaction with 1/10 the ordinary quantities only two drops, each 1/100 c.c. of each serum, are needed. For this purpose pipettes with body some 3 cm. long and 3 mm. in outer diameter suffice. But for measuring out the normal saline for 60 or 70 test-tubes in such a micro-Wassermann test some 10 cm. of tubing 7 or 8 mm. in diameter may conveniently form the body of each pipette. The stock of glass tubing may advantageously be kept covered up from dust and fog.

For making the pipettes a length of tubing suitable for two pipettes is heated at the middle and is then drawn out so that the capillary portion is nearly cylindrical, that is, tapering very gently at the place where it is to be cut off when gauged.

The wire-gauge used in this investigation is the Morse drill and wire-gauge, made by the L. S. Starrett Company and by other makers. It has holes size 1 to size 80, from 5·79 to 0·34 mm. in diameter. A very similar commonly used gauge is the Lancashire pinion wire-gauge or Stubbs gauge. A comparative table of the most useful sizes in these gauges is given below. A capillary is gauged by gently pushing it down into the suitable hole until arrested. The capillary is then cut close above the steel plate with a glass-cutting knife. The gauged pipettes ought to be kept on a layer of grease-free cotton-wool in a box lined with clean blotting paper. The capillary ought not to be touched with the finger or with anything else that has a trace of grease. Tubes larger than 5·79 mm. may be gauged by a vernier slide gauge—e.g., the Columbia. Holes less than 0·34 mm. may be found in a draw-plate for drawing fine wire. Such draw-plates may require to be calibrated by the user—by low-power microscope micrometer measurement of holes and of capillary or at least by determining, as described later, the drop-volume corresponding to that hole. Both wire-gauge and knife ought to be thoroughly freed from grease—e.g., by repeated washing and swabbing with benzine and grease-free cotton-wool, and to be kept wrapped in clean blotting paper.

The volume of a drop of a given liquid yielded by any given pipette at any one convenient rate of dropping and at any convenient temperature may be easily determined by the worker as follows. A measuring pipette—e.g., 1 c.c. or ½ c.c.—is tested by weighing it first empty and then filled to the mark with water and laid horizontally in the scale pan. Now, as the cut-off capillary is to be jotned to the point of the measuring pipette, with 1 cm. or less of washed bicycle valve-tubing, the volume of water has to be displaced in the measuring pipette till the lower meniscus can be seen above the upper edge of the valve-tubing and the new position of each meniscus has to be marked by a scratch. As the lower meniscus strongly tends to return to the narrow point of the measuring pipette, the volume of water will have to be kept displaced by steady suction with such a device as a glass rod lubricated with glycerine and sliding in a short rubber tube slipped on to the upper end of the pipette.

The rate of dropping—that is particularly the degree of steadiness in the discharge or release of the drop—has an appreciable effect on the size of the drop. Rapid or sudden discharge produces rather larger drops than does steady dropping at a slow rate. When a certain slowness is reached further slowing produces no appreciable change in the drop size. For pipettes as small as Morse 80 (0·34 mm. diameter) this constancy is reached as soon as slowing reaches 1 second per drop. The desirable steadiness of pressure may be attained by working against the resistance of a suitably long capillary portion in the smaller pipettes, or against a capillary throttle or a tight cotton-wool plug in the upper end of the larger pipettes in which it may not be convenient to have a long enough capillary tip.

For more exact work, such as stalagmometry for determination of surface-tension, my constant-pressure stand apparatus[5] may be used. Also for the fairly exact measuring of a few drops of cerebro-spinal fluid in counting the cells a hand pattern of the constant-pressure apparatus[6] is suitable. But for serological work an ordinary rubber teat suffices. The teat, if of ample capacity, is best managed, not by having the worker's finger and thumb vibrating on the unsteady inflated teat-walls, but by steadying the ulnar edge of the thumb-tip against the radial edge of the forefinger with the teat fundus collapsed between them, compression on the teat being accomplished by rolling more and more of the thumb pulp over the fore-finger pulp and inflation by rolling contrariwise.

Using a teat in this way at fairly rapid hand-dropping I have, for instance, at my study table just tested three pipette-points gauged in the same hole (Morse 75) and joined, as above described, to a 0·5 c.c. pipette filled with tap-water. No. 1 gave 41½ drops, but the drops formed asymmetrically, indicating slight soiling at the non-wetted part of the point; No. 2, clean, gave 40½ and again 40½; No. 3 gave 40⅔ drops.

The discrepancy between 81 drops per cubic centimetre and the 87 drops per cubic centimetre for Morse 75, as given in the table, is accounted for thus: 1. The study temperature, 11° C., is 9° lower than the temperature, 20° C., for which the table was made. The drop-count increases with the fall of the surface-tension about ¼ per cent. for each 1° C. rise of temperature. 2. The trace of "grease" in the non-alkaline distilled water makes the drop-count rather higher than that of tap water. 3. The drop-rate, though fairly uniform, was less than ½ second per drop.

If only a couple of drops, with an interval between them, have to be delivered from a small pipette of serum, then instead of a teat a few centimetres of rubber tubing may be used, like a teat with a hole in it.

If, on the other hand, considerable quantities of

[5] Donald: Proceedings of the Royal Society, B, vol. lxxxvi., 1913, pp. 199, 201.

[6] Idem: THE LANCET, May 24th, 1913, p. 1447.

the liquid have to be dropped, then the pipette-reservoir may advantageously consist of a separator cylinder held vertical in a clamp on a stand. This becomes a convenient constant-pressure reservoir by the addition of a Mariotte tube.[7] Thin tubing suffices, say, 3 mm. in outer diameter, passing air-tight through a rubber cork in the upper aperture of the cylinder. If the tube passes down to the tapered outlet of the cylinder then (1) the liquid, if a suspension, is kept well stirred from the bottom, and (2) the whole height of the cylinder may be emptied at constant pressure. The effective "head" of liquid is measured from the lower aperture of the Mariotte tube to the dropping outlet, the tube between being kept full of liquid. Various sizes of dropping-nozzle may be fitted to the lower end of the delivery tube by ferrules of rubber tubing or of cork. When these nozzles do not provide enough resistance to slow the drop-rate sufficiently, then a suitable "throttle" of glass tube with one capillary end may be fitted in the down-tube below the stop-cock, or else a second stopcock[8] may be provided on the down-tube and easily adjusted, once for all with each nozzle, to give the necessary throttling, the other stopcock being used purely as a stopcock.

This constant-pressure reservoir will give such regularity of drops at any required rate as to allow the use of dropping-nozzles even as large as 14·5 mm. outside diameter giving ¼ c.c. drops. To prevent these large nozzles from emptying out a rubber diaphragm consisting of a slice of pressure tubing may be inserted a little inside the level of the aperture.

The drop-count per cubic centimetre of distilled water, at 20° C., at a drop-rate of 60 per minute attained by constant-pressure apparatus, stand pattern, was found to be as shown above for *Morse*-gauged pipettes. The diameters of the Stubbs holes are given merely for comparison with those of the Morse gauge. Small differences of dropping-point diameter have proportional differences of drop-count.

Gauge No.	Diameter in mm. Stubbs.	Diameter in mm. Morse.	*Morse.* Drops per c.c.
80	0·330	0·343	131·0
79	0·356	0·368	122·0
78	0·381	0·406	112·9
77	0·406	0·457	101·0
76	0·457	0·508	90·0
75	0·508	0 533	87·0
74	0·559	0·572	81·2
73	0·584	0·610	—
72	0·610	0·635	73·5
71	0·660	0·660	—
70	0·686	0·711	65·5
69	0·737	0·743	63·3
68	0·762	0·787	58·5
67	0·787	0·813	—
66	0·813	0·838	56·5
65	0·838	0·889	—
64	0·889	0·914	54·0
63	0·914	0·940	—
62	0·940	0·965	51·6
61	0·965	0·991	—
60	0·991	1·016	49·8
59	1·016	1·041	—
58	1·041	1·067	48·3
57	1·067	1·092	47·9
56	1·143	1·181	45·0
55	1·270	1·321	—
54	1·397	1·397	38·9
53	1·473	1·511	—
52	1·600	1·613	34·0
51	1·676	1·702	32·6
50	1·753	1·778	31·4
49	1·829	1·854	29·8
47	1·956	1·994	28·2
46	2·007	2·057	27·3
43	2·235	2·261	25·5
33	2·845	2·872	20·3
28	3·531	3·569	16·7

[7] A Mariotte tube was used by Rosset, Bulletin de la Société Chimique de Paris, vol. xxiii. (1900), p. 245.

[8] uch separator cylinders with two stopcocks may be obtained from Messrs. Baird and Tatlock, Cross-street, Hatton Garden, E.C.

For measuring out rapidly a number of small equal volumes either of living cultures or of sterile liquids, nutrient or otherwise, into cultures the dropping pipettes may easily be sterilised. The plugging material may be either cotton-wool or asbestos fibre. Sterilisation may be done either before or after calibration. If sterilisation precedes calibration the capillary may be lightly flamed before use. If sterilisation follows calibration the pipettes may be kept in the copper sterilising can. Plugging with previously ignited asbestos fibre has the advantage of allowing sterilisation of the whole pipette to be done quickly over the Bunsen flame and of altogether obviating the development of tarry fumes from overheated cotton, which fumes would render the dropping point "greasy," and might have appreciable antiseptic action.

A SIMPLE AND PRACTICAL METHOD OF LOCALISING AND MEASURING THE DEPTH OF FOREIGN BODIES.

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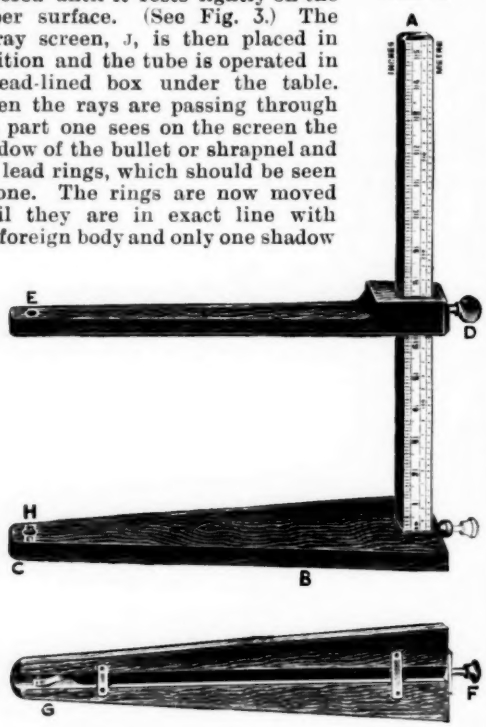
AT such a time as the present I feel that no apology is necessary in bringing before the notice of the profession any method of localising and estimating the depth of foreign bodies from the surface of the body, be it bullet or shrapnel, which is simple and at the same time sufficiently accurate to be of real assistance to the surgeon in removing it. The following method is one which I have been using at the 2nd Northern General Hospital at Leeds with considerable success, and in publishing it I do so in the hope that it may prove of practical service to others.

The apparatus, which has been made to my instructions by Messrs. Reynolds and Branson, of Leeds, is quite simple and its cost trifling. The accompanying illustrations will enable the reader to follow more readily its description. It is made throughout of wood and consists of an upright piece, A (Fig. 1), which is marked off in inches and centimetres; two horizontal pieces, the lower one fixed to the base of the upright and set at a right angle to it; the other, also set at a right angle to the vertical piece but movable on it, with a screw attachment, D, by means of which it can be fixed in any position on the upright. At the free end of each of these horizontal arms, E and C, a ring of lead is let in, the aperture being large enough to permit of a lead pencil passing through. It is of the greatest importance that these two rings should be exactly superimposed. The lower horizontal arm is grooved on its under surface, and in this groove a vulcanite rod, F, slides to and fro. At the free end of this same horizontal arm there is also a small spring, G, attached by one end to the groove and supporting at the other end a small ink pad, H. When the vulcanite rod is pressed home it impinges on the spring and pushes the ink pad up through the ring of lead.

The manner in which the apparatus is used is as follows. The lower arm is pushed under the part to be examined and the upper arm is lowered until it rests lightly on the upper surface. (See Fig. 3.) The X ray screen, J, is then placed in position and the tube is operated in a lead-lined box under the table. When the rays are passing through the part one sees on the screen the shadow of the bullet or shrapnel and the lead rings, which should be seen as one. The rings are now moved until they are in exact line with the foreign body and only one shadow

FIG. 1.



is seen. The vulcanite rod is now pressed home and the ink pad forced up through the ring, so that it impinges on the skin and marks it. An ink pencil is then passed through the upper ring and the skin marked above. We have now two points marked on the skin and an imaginary line passing from one to the other cuts directly through

FIG. 2.

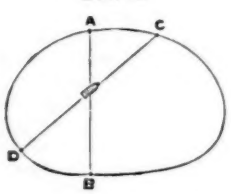
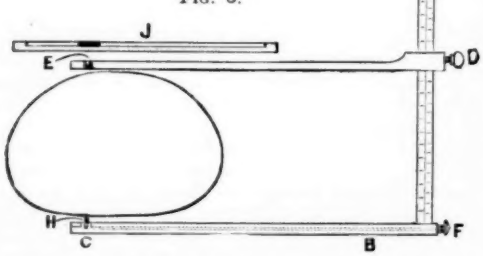


FIG. 3.



the foreign body. The part is now rotated into another position and the same procedure gone through. The skin is now marked at four points with two imaginary lines passing through the part. It will be seen that the foreign body must be at the point of intersection of these two lines. It now remains for us to determine the distance from the foreign body to any of these four points. I think the following will be found a simple and accurate method of doing this.

I take a piece of fairly stout fuse wire which is readily moulded and is without spring, and I apply it to the surface of the part under consideration, stretching it, say, from C to B in the first diagram (Fig. 2) and marking it at the points A and D. I then carefully remove it, and placing it on a flat surface I stretch a piece of fine wire from A to B and another from C to D. It will be seen that these two intersecting wires now take the place of the two imaginary lines which passed through the part, and the position of the foreign body must be at the point of their intersection. It only remains now to measure the distance from this point to the points A, B, C, D, which represent the four points on the skin.

Since writing the above article I have been informed that a similar principle to the one involved in my method as described above has been in use at the Middlesex Hospital. As, however, the localiser which I use is quite different from anything I have so far seen, and I think possesses certain advantages over other localisers, I venture to publish a description of it.

Leeds

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

SPONTANEOUS RUPTURE OF UTERUS WITH UNRUPTURED MEMBRANES AND ACCIDENTAL HÆMORRHAGE.

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With a Note by S. LEWIS GRAHAM, M.S. Lond., F.R.C.S. Eng.

THE patient, aged 34 years, was admitted into hospital as an emergency case owing to a grave general condition during labour. She had had five children, and all her previous labours had been normal, the last child being born 14 months previously. She had had no serious illness except typhoid fever at 7 years of age.

On admission, at midday, the patient was in labour. She looked pale and collapsed; she objected to examination. The pulse-rate was 88 and the temperature 97·8° F. She stated that she had had a heavy loss of blood that morning. Nothing was found wrong in the chest. The abdomen was of the size of an 8-months pregnancy. A vertex presentation had to be dealt with, and there were uterine contractions every few minutes. Per vaginam the external os was found to be of the size of a crown piece. The membranes were unruptured. The placenta was not felt and the examining finger had blood upon it. There were many old scars on both legs. At 2 P.M. the patient's condition was worse. Pulse 102, thready, and of low tension. There had been no loss by the vagina, and the membranes were still unruptured. The patient was extremely restless. She was then seen by Mr. S. L. Graham and a diagnosis of ruptured uterus or accidental hæmorrhage was made. Laparotomy was performed forthwith.

On opening abdomen half a pint of free blood was found in the peritoneal cavity and some clots. The uterus was opened longitudinally in front in mid-line. The placenta was found at the fundus, but completely detached from the uterine wall and separated from it by a large mass of blood-clot. The placenta and membranes and their contents were removed entire without rupturing them. The fœtus was dead. The uterus was then examined and was found to have on the posterior wall at the level of the ovarian ligaments two transverse lacerations, one about 4 inches and the other about 3 inches long. These penetrated through the peritoneal coat and superficial muscular fibres of the uterus. There were also about half-a-dozen other lacerations, like cracks, but not so long or deep. Subtotal hysterectomy with peritonealisation of all stumps was then performed. The patient made an uninterrupted recovery, was discharged from hospital in three weeks, and has been at home for some months in perfect health.

Note by Mr. LEWIS GRAHAM.

The diagnosis of this case was obscure, but the patient appeared too ill to stand natural labour, so exploration with view to Cæsarean section was decided upon. The feature of paramount interest was the marked tearing of the uterus without the membranes having been ruptured. This appears similar to, and an earlier condition of, the case recorded by me in THE LANCET of Nov. 28th, 1914, of complete rupture of uterus with unruptured membranes. In the case now reported there was also considerable accidental hæmorrhage. Hysterectomy was performed as being the most certain way of securing the woman from further loss (which it was thought she could not bear), of guarding her against sepsis, and as a prophylactic against a rupture of the uterus should she ever become pregnant again.

Birmingham.

PROLAPSE OF THE LUNG THROUGH A DEFICIENCY IN THE ANTERIOR PORTION OF THE DIAPHRAGM.

BY J. N. KILNER, M.B.LOND., D.P.H.OXON.,
ACTING CHIEF MEDICAL OFFICER, BENGAL-NAGPUR RAILWAY, INDIA.

THE following case received for treatment at the Railway Hospital, Khargpur, is interesting on account of the condition found at operation.

A male Hindu, aged about 30 years, had suffered for two years from epigastric pain brought on by food. He often obtained relief by inducing vomiting. A swelling occasionally appeared above and to the right of the umbilicus. He had lost flesh and strength. The bowels were regular. There was no further history of importance.

During examination pain was elicited by deep pressure at a point external to the right rectus abdominis muscle and about two inches below the costal margin. The uppermost segment of the right rectus was slightly rigid. An ill-defined thickening could be felt along the lower edge of the liver in the region of the ninth costal cartilage. Immediately after the examination had been concluded a tumour, measuring about two inches by one and a half inches, suddenly appeared at the point of intersection of the mid-Poupart and infracostal lines. The long axis was transverse. The swelling rapidly spread up to the middle line and showed irregular movements, which, passing from right to left, were very puzzling and difficult to explain. On palpation the tumour was ill-defined, soft, and boggy. It could not be reduced. There was no pain or tenderness. The percussion note was flat. After remaining visible for some minutes the swelling vanished.

The abdomen was opened by an incision to the right of the middle line. A bubble of gas, two or three cubic centimetres in volume, appeared for a moment beneath the peritoneum just as this was incised. Nothing abnormal was found in the abdomen until the gas bubble appeared again from beneath the costal margin and was found to lie between the folds of the falciform ligament of the liver. It was followed immediately by a pyramidal mass of tissue, of which a portion three inches long and three inches broad at the base presented below the costal margin. This, which was evidently right lung, was dull red in colour, firm and elastic to the touch, and easily reduced into the thorax through an oval opening in the diaphragm. The opening admitted three fingers and was bounded in front by the posterior surface of the lower part of the body of the sternum, and behind by a rigid arch. The xiphisternal and adjacent costal fibres of the diaphragm appeared to be deficient. A finger passed through the opening towards the left rested on the pericardium.

No attempt could be made to close the opening in the diaphragm. The abdominal wound was sewn up, and it healed by first intention. A week after the operation the patient had a severe hæmorrhage from the lungs. A second hæmorrhage, nearly as profuse, occurred 48 hours later. Recovery from the effects of the bleeding was rapid. When he left hospital a month later his general condition was very satisfactory and there had been no recurrence of either tumour or pain.

The following points are worthy of note:—

1. The symptoms complained of were all referred to the abdomen.

2. Cough or other effort by no means necessarily resulted in the appearance of the swelling, which, on the other hand, was first seen when the patient was lying still in bed.

3. The movements in the tumour might easily have been mistaken for peristalsis. They were, however, too quick and too irregular in volume and occurrence.

4. The support given by dressings and bandages and later the formation of adhesions between the liver and abdominal wall may have prevented the descent of the lung after the laparotomy.

Since writing the above the patient has reported a return of the pain, but no reappearance of the swelling up to date (six months after discharge from hospital).

Calcutta.

CENTRAL MIDWIVES BOARD: NEW REGULATIONS.—The Central Midwives Board has amended its regulations in respect of the course of training and the conduct of examinations of candidates for enrolment as midwives, and the preliminaries of submission of the regulations to the Privy Council and the General Medical Council having been complied with, they will come into force on July 1st, 1916. The changes affect the rules now numbered C. 1, C. 2, and C. 3, which prescribe the course of training to be undergone by candidates and the form of the certificates to be produced as evidence of the candidate's qualifications.

THE FALL IN THE BIRTH-RATE.—In the quarterly return of marriages, births, and deaths registered in England and Wales just issued it is stated that the births registered in the third quarter of 1915 correspond to a rate of 21·0 annually per 1000 of the population in the middle of 1914. This rate is 4·5 per 1000 below the mean birth-rate in the ten preceding third quarters, and 3·2 per 1000 below the rate in the corresponding period of 1914; it is the lowest birth-rate recorded in any quarter since the establishment of civil registration. Of the 197,492 births, 8364 (or 1027 fewer than the number in the corresponding quarter of 1914) were illegitimate. The natural increase of population in England and Wales last quarter by excess of births over deaths was 88,079, against 117,552, 112.055, and 111,577 in the third quarters of 1912, 1913, and 1914 respectively. This natural increase has therefore diminished in a year by nearly 23,500 for the quarter. On the other hand, the number of marriages during the second quarter of the year was 15,942 in excess of the number for the corresponding quarter of 1914.

Medical Societies.

MEDICAL SOCIETY OF LONDON.

Gas Poisoning: Physiological Symptoms and Clinical Treatment.

A MEETING of this society was held on Nov. 29th, Dr. W. PASTEUR, the President, being in the chair.

Professor LEONARD HILL read a paper on Gas Poisoning: Physiological Symptoms and Clinical Treatment. He pointed out that all the propellants now in use set free enormous volumes of gases, but that such was the diffusive power of the atmosphere that no poisoning from them could be traced, nor could we suppose that the sum of suffering produced by gas was greater than that inflicted by shell wounds with the attendant sepsis, lockjaw, and maiming. Dividing poison gases into those which killed by cutting off the oxygen, those which paralysed the respiratory centre, and those which acutely irritated the respiratory passages, he indicated that the Germans had chosen the last class because these gases were heavier than air and suitable for drifting with the wind. Drift-gas must be considerably heavier than the air or diffusion would disperse it, and for this reason Zeppelins could not drop poison bombs on London. Professor Hill said that poison gases had been investigated in Germany years ago from the ostensible point of view of making safeguards against dangerous trades, and a critical survey of the papers in connexion with these investigations pointed to chlorine or bromine as the gas to be used in war, as these were the only gases which came up to the requirements—viz., (1) that a 1 in 10,000 concentration rapidly put a man out of action by asphyxiating him owing to its intense irritative property; (2) was much heavier than air; (3) was manufactured in huge quantities in trade processes; (4) was easily compressible into cylinders for convenience of transport and handling; and (5) a respirator was easily contrivable to protect the person who manipulated the brigade gas attack. It was obvious that no drift-gas could be used offensively from which the users were unprotected. The density of the various asphyxiating gases which at first were suspected of being used was sulphur dioxide, 2·21 times heavier than air; nitrogen peroxide, 3·17; chlorine, 2·45; phosgene, 3·49; bromine vapour, 5·53. The power of liquefying a gas by cold or pressure, or a combination of the two, enabled the chemist to get into a convenient form large quantities of these asphyxiating gases, but the turning of these liquids back into gases might be troublesome, because the heat withdrawn during volatilisation might be so great as to freeze the nozzle and stop the outflow. Special devices were required to produce the expulsion of the gas some distance in front of the trench and to prevent the retardation of flow by freezing. Sulphur dioxide irritated the eyes and air tubes in concentrations of 1 in 2500; it was liquefied by a pressure of three atmospheres, chlorine by six atmospheres. Of the two, chlorine was a far more powerful asphyxiant, being unbearable in a concentration of 1 in 10,000. Peroxide of nitrogen could be liquefied below 26° C. In comparison with chlorine, used in weak concentrations, it had a delayed irritative action on the lungs, and therefore, owing to its want of stopping power, was far less suitable for use. Firemen were sometimes exposed to fumes of nitric acid—e.g., after the bursting of carboys; they were unaffected at the time, but developed a fatal inflammation of the lungs during the next 12 hours. As the oxides of nitrogen played so important a part in the manufacture of explosives, it was unlikely that the peroxide would be used as a drift poison gas. Bromine vaporised at atmospheric pressure and boiled at 59° C. It was far heavier than, and as powerful an asphyxiant as, chlorine. Germany produced almost the whole of the European supply. It had been said that certain bromine organic compounds had been extensively used by the Germans in asphyxiating and lacrymating shells. The vapours of these substances in concentrations as little as one part in several millions of air were said to put a man out of effective action by causing watering of the eyes and inability to open them, so specifically irritating were they to the conjunctiva. They also were said to cause in greater concentrations irritation of the respiratory mucous membrane. Chlorine could be made very easily by heating a mixture of hydrochloric acid and black oxide of manganese, or by electrolytic processes. It could be stored in lead-lined cylinders. The gas above the liquid chlorine exerted a pressure of at least 90 lb. per square inch, so that all that the Germans required to project chlorine was a long tube projecting in front of the trench parapet and a valve. The spray turned into a yellowy-greenish vapour, and owing to its weight drifted with the wind along the ground. Anyone who had watched smoke from a weed bonfire drift over a field would see how far the chlorine vapour might be carried in poisonous concentration. It would sink into trenches, shell pits, mine craters, cellars, and dug-outs. To produce a concentration extending 10 feet up of 1 in 10,000 during a period of 10 minutes in a wind moving uniformly four miles an hour, over 1000 cubic feet of gas were required for each 100 yards of front. This was leaving out of account diffusion and the ventilating power of the atmosphere. It was clear then how large a volume of gas was required for an attack and how any gas which did not come up to the 1 in 10,000 standard must be ruled out.

Professor Hill then dwelt on the effect of breathing an atmosphere poisoned with chlorine, and added that if the patient survived the first or asphyxial stage, which gradually passed off after some 36 hours, nephritis due to the intense and prolonged dyspnœa and struggles for breath might follow. Chlorine, he said, in every case expended its fury on the lungs. Post-mortem examination in the acute cases showed intense congestion of the mucosa of the trachea and larger bronchi. These tubes were filled with a thin light yellow frothy secretion, some of which escaped from the mouth and nose when the subjects were first laid on the table. The fluid was highly albuminous, solidifying on heating. The larger bronchi only could be traced, the smaller being lost in a condition of intense congestion and œdema which affected the lungs as a whole. The lungs did not collapse in these acute cases, but appeared like a solid cast of the thoracic cavity, and were greatly increased in weight. On incision the lung tissue appeared of a deep maroon-red colour, and the fluid exudation flowed from the cut surfaces in abundance. Light grey patches were to be seen on the surface of the lungs amidst the congested areas. They were found to be due to emphysema. So intense was the obstruction to the entry of air, and so violent the efforts of respiration, that emphysema was produced in these least poisoned parts where air could still enter. One could picture how the violence of the respiratory efforts brought to bear on a relatively few small parts of the lungs distended and broke down the walls of the alveoli, expelling the blood into surrounding congested areas. The parts of the lung tissue not affected by emphysema showed intense congestion of the capillaries, and many of the alveoli were seen filled with exudate, which took on the eosin stain. Into some alveoli red corpuscles escaped, and larger patches of hæmorrhage might occur. The heart in these acute cases was congested, particularly on the right side. The stomach showed a condition of catarrh, the mucosa being covered with a thick yellowish mucus, and hæmorrhages being visible in the submucosa. These changes might conceivably be due to the swallowing of saliva and exudate from the nose and expectorated fluid in which chlorine was dissolved. The venous congestion of the stomach and other abdominal organs and of the brain was due to the asphyxial character of the death.

Professor Hill then described the effect of the experimental poisoning of animals, and concluded an interesting paper by advising a line of treatment. For the severe cases of chlorine poisoning the one object of treatment must be that of getting rid of the exudation in the air tubes which was drowning the victims. Experiments on animals showed that the frothy fluid could be easily squeezed out of the lungs and trachea by rhythmic compression of the thorax, and that the dyspnœa which was threatening life could be greatly, if only temporarily, eased by this means. Artificial respiration was reported to have given good results in several of the cases on which it was tried. The artificial respiration required to be repeated as often as the dyspnœa became excessive. The case was recorded of one man, almost moribund, who was treated in this way on four successive occasions, and who ultimately recovered. After squeezing out the fluid, air might be blown into the lungs by mouth-to-mouth artificial respiration, to overcome the resistance of the froth in the smaller tubes and expand enough lung

to keep the patient alive. It was true that emphysema might be caused by so doing, but if it was a question of just carrying a man through the threatened asphyxia, one could not hesitate to get air into the lungs by these means. He took over to Flanders an apparatus constructed by Messrs. Siebe Gorman, called the Vivator, in which there was a foot-pump which fed a face-mask through a flexible tube. By each downstroke a measured volume of air, or oxygen, was pumped into the lungs; by each upstroke a valve was opened which allowed the air to escape from the lungs by the elastic recoil of the thorax and lungs. With this apparatus respiration could be kept going in the collapsed or unconscious cases, the fluid now and again being evacuated by squeezing the thorax and by posture. The inverted posture would help to drain out the fluid. He was told that several of the patients of themselves hung their heads down over the side of the stretcher, or table, in order to aid their expectoration. Emetics had proved very useful in giving relief to the less critical cases. Half a pint of salt and water or 8 grains of copper sulphate, followed by large draughts of lukewarm water, were recommended. A brush, or the patient's finger, put to the back of the throat would initiate the vomiting without delay. The act of vomiting was reported to cause the expulsion of a large quantity of the frothy fluid. Administration of oxygen relieved the cyanosis and improved the condition of the subjects. Not only did the percentage of carbonic acid in the blood rise in the suffocative condition, but other acids, such as lactic acid, increased in quantity, owing to the lack of oxygen. When the blood was oxygenated by breathing oxygen, these other acids did not appear, and the acid intoxication was therefore so far eliminated. Tests of the power to hold the breath showed that a higher percentage of carbon dioxide could be borne when oxygen rather than air filled the lungs. To give oxygen to a man who was struggling for breath and needing to expectorate was no easy matter. It was difficult to get tolerated any kind of close-fitting face-mask. The ordinary clinical method of administering oxygen through an open funnel held near the mouth and nose was of relatively small value; nearly all the oxygen was wasted by escaping into the atmosphere; just at the period of inspiration the stream which reached the mouth and nose was not enough, so that the air drawn into the lungs was but very slightly enriched. He had found the oxygen in his own alveolar air increased by only 1 or 2 per cent. when oxygen was administered to him by a sister in a London hospital. If a loose kind of face-mask were made out of a towel, and the oxygen tube were led under that, and the oxygen were sent in sufficient stream to blow away the exhaled carbon dioxide, then 70 per cent. of oxygen could easily be obtained in the alveolar air. Messrs. Down Brothers had made a transparent face-mask on his design fitted with a curtain which draped the face, by which oxygen could be effectively given on this plan—but not economically. A 20 ft. cylinder was soon exhausted by these methods. To give oxygen economically a well fitting face-mask, breathing bag, and cartridge, for absorbing the exhaled carbon dioxide, must be used. The subject breathed through the cartridge in and out of the breathing bag, which was filled with oxygen from the cylinder as required. The cartridge was loosely packed with small pieces of caustic soda-coke; to prepare these the coke pieces were heated red-hot and dipped into strong caustic soda. They offered a splendid absorbing surface and no appreciable resistance to the breathing. This apparatus was made by Messrs. Siebe Gorman, and he took over some for use in Flanders. The difficulty in using such lay in keeping the mask over the face of a man who wanted to struggle and expectorate. Oxygen breathed between the periods of expectoration would undoubtedly give him relief, and with the above apparatus a 20 ft. cylinder would give a supply lasting many hours.

Experiments on animals had shown them that compressed air relieved the dyspnœa to the same extent as oxygen does. On placing a patient in a medical air-lock, such as was used in compressed-air tunnel works, and compressing him to two atmospheres, he would breathe double the concentration of oxygen, and at the same time would be able to expectorate and struggle as he pleased. The compression of the air when first applied would halve the size of the air-bubbles in the frothy liquid which obstructed the air-tubes, and this should give relief by lessening the obstruction. Artificial respiration could be applied in the compressed-air chamber and the subject be kept in it for several hours and then slowly decompressed. The medical locks were fitted with air-locks through which the medical officer could enter or leave. The difficulty, of course, lay in the provision of such medical locks, heavy cylindrical boiler-like structures, each of which would hold only four or five patients, with the necessary oil-driven compressor engine. A small medical lock and engine would go on a three-ton lorry, but it was a serious thing to hamper the transport of the army with such a provision. There was another way in which oxygen might be administered without the use of a mask, and that was by drawing over the stretcher containing the patient a cylindrical balloon, say 10 ft. by 4 ft., tying up the end, and then distending the balloon with oxygen. The giving of atropine had been extolled on the theory that it lessened secretion of the fluid and dilated the bronchial tubes. In severe cases of poisoning they had not found it of the least service. It was claimed that the inhalation of stramonium vapour from cigarettes relaxes the bronchial muscles: this might afford relief in the mild cases, which recovered whether so treated or not. The chlorine poisoning of the lungs was comparable to extensive burns of the skin, and the same general treatment to support strength and lessen shock was required. Just as septic infection of the skin was the sequel of the burn, so pneumonia and bronchitis followed chlorine poisoning. In their experimental animals severe poisoning had in every case had this end, and they knew of no means of preventing it. Warmth and good nursing might pull a man through, but these conditions were difficult to apply to animals.

Professor BENJAMIN MOORE said that the œdema produced by the gas was a protective reaction which was overdone, and the exudate practically drowned the patient. The first aim of treatment should be drainage.

Dr. WILLIAM HILL asked whether any surgical effort had been made in these cases. He suggested that possibly a combination of tracheotomy and the use of exhaust bottles might allow both of regular drainage and the administration of oxygen.

Dr. NEWTON PITT said that from clinical experience of œdema of the lung and of serous exudation into the lung, such as occurred after tapping the pleura, atropine has been found distinctly useful. There was also some evidence in favour of the use of adrenalin and pituitary extract.

ROYAL SOCIETY OF MEDICINE.

SECTION OF LARYNGOLOGY.

Exhibition of Cases.—Demonstration of Simpson-light Apparatus.—Malignant Stricture of the Œsophagus.

A MEETING of this section was held on Nov. 5th, Dr. J. W. BOND, the President, being in the chair.

The following cases were shown.

The PRESIDENT: Encapsulated Tumour removed from region of the left tonsil, soft palate, &c. The patient, aged 60, was found to have a growth at the back of his mouth. The fauces were two-thirds obstructed by a mass on the left, projecting from between the pillars of the fauces, upwards into the naso-pharynx and downwards to the base of the tongue; the posterior border could not be reached behind. Externally it presented between the angle of the jaw and mastoid. As a whole it was smooth, hard in parts, with defined border, and slightly movable. Operation five days later by exposing the surface of the growth in the fauces, no splitting of the cheek being necessary. A preliminary laryngotomy was performed. The pathological report is of a roughly lobulated, encapsulated mass, weighing 51 grm. and measuring 6·5 cm. by 4·75 cm.: "On section it is composed of alveoli and strings of cells enclosed in a stroma of fibrous tissue, with cartilaginous and myxomatous areas. Its general structure is that of an endothelioma, such as would arise in the palate or in a salivary gland. We do not think it is strictly a tonsillar tumour."

Sir STCLAIR THOMSON: Intrinsic Cancer of the Larynx one year after operation by laryngo-fissure. This patient, a man aged 70, was shown to the section on Nov. 6th, 1914, before operation, and again on Dec. 4th, after the operation of laryngo-fissure on Nov. 12th. A section

of the growth removed at the operation was shown before the section on Feb. 5th, 1915, and was reported on by Professor S. G. Shattock to be an early squamous-celled carcinoma. The microscopic examination of the growth removed by laryngo-fissure on Nov. 12th suggested that the growth had spread right up to the line of excision in the posterior subglottic region. A second laryngo-fissure was therefore performed on Nov. 20th, and the patient was shown to the section a fortnight later. The case was exhibited for the following reasons: 1. The diagnosis was made in the absence of any microscopic report and in a case where the cord preserved its mobility. 2. Although the patient had reached the age of threescore years and ten, he was able to support two operations for laryngo-fissure within ten days of one another. 3. He passed the first—i.e., the important—year of probation without any suspicion of recurrence. 4. He has a good strong voice and enjoys excellent health.—The PRESIDENT and Dr. W. JOBSON HORNE commented on the difficulty of obtaining a clear view and of controlling hæmorrhage during the operation of laryngo-fissure.—Sir STCLAIR THOMSON advised a preliminary injection of eudrenine into the tissues in front of the trachea one hour before operation. At the time of operation he injected 15 minims of a 2½ per cent. solution of cocaine into the lumen of the trachea and waited 10 minutes. After opening the larynx he placed inside it a pledget of cotton-wool soaked in cocaine and adrenalin solution. To improve the view he semi-dislocated the larynx.

Mr. G. H. L. WHALE: Myxoma of the Ventricle of the Larynx removed from a man, aged 28, by laryngo-fissure.—Sir STCLAIR THOMSON was not sure that such a tumour as a myxoma of the larynx existed, and wondered why the larynx had been opened to remove an innocent growth.—Mr. WHALE replied that the report of myxoma came from the Lister Institute, and that the larynx had been opened because he was unable to remove the growth by endo-laryngeal methods.

Mr. HUNTER TOD: Case of Congenital Fistula of the Nose in a male adult. At birth a small opening was noticed at the lower part of the bridge of his nose. As long as the patient could remember a slight secretion could be squeezed out on pressure. During the last two or three years an inflammatory swelling had occurred intermittently over the bridge of the nose which appeared to be due to retention of the secretion.—Mr. W. STUART-LOW advised removal by free dissection.—Mr. FRANK A. ROSE had found scraping and caustics unsatisfactory in a similar case.

Mr. HUNTER TOD also showed a case of Malignant Papillomatous Growth of the Left Inferior Turbinate and Ethmoidal Region. The patient, a married woman aged 62, was first seen in January, 1911, complaining of left-sided nasal obstruction and epistaxis. The left side of the nose was found to be occupied by a soft papillomatous growth attached by a broad base to the inferior turbinate. The growth was removed, but recurred in three months. It was then removed again. Microscopical examination of portions of the growth on each occasion proved it to be a proliferating papilloma. In December, 1911, the patient was shown to the section by Mr. E. W. Bain. There was discussion with regard to the nature of the growth, it being considered of rare occurrence. The Morbid Growths Committee reported as follows: "All agree that it shows the structure of an innocent papilloma." The patient ceased attending hospital, and only returned in October, 1914, complaining of pain over the left side of the face. The left side of the nose was filled with growth which appeared more friable and hæmorrhagic than when seen two years previously. There was also much purulent discharge. The antrum was dark on transillumination and was punctured. A small quantity of pus was washed out. A portion of the growth was removed and the pathologist reported: "Columnar and polygonal-celled carcinoma." The patient was operated on on Oct. 29th, 1914. The external carotid was first tied in the neck. An incision was made from the level of the inner canthus of the left eye and continued downwards along the junction of the nose and cheek until it entered the lower margin of the nostril. The anterior alveolar and nasal portion of the superior maxilla was removed and the growth could be seen to have pushed outwards the nasal wall of the antrum, so that the antrum itself was quite a small cavity and was filled with pus. The growth was removed piecemeal. The whole of the antro-nasal wall, including the inferior turbinate and ethmoidal region, was removed and the sphenoidal cavity curetted. At the end of the operation the interior of the nose appeared as a large smooth cavity. The patient made an uninterrupted recovery. In March, 1915, some granulations were removed from the sphenoidal region. Microscopical examination showed "solid trabecular columnar and polygonal-celled carcinoma of the mucosa." A tube of radium was applied. On Oct. 5th a few granulations appeared near the sphenoidal opening and radium was applied again. The nasal cavity now appeared to be quite free from growth.

Mr. W. DOUGLAS HARMER: Demonstration of Simpson-light apparatus. Cases illustrating results obtained by S-ray treatment: (*a*) Lupus of the Face and Hard Palate; Tuberculous Disease of the Foot; (*b*) Lupus of Anterior Nares; (*c*) Rodent ulcer of the Nose and Face; and (*d*) Nasal polypi and asthma. Mr. Harmer said that the medical properties of this light, of which Mr. Simpson was the inventor, had been discovered accidentally. Medical treatment was carried out by exposure to the rays and by inhaling the vapour which was given off. Exposure to the rays was not tolerated as a rule for more than about three minutes at a sitting and caused distinct reaction. He had been favourably impressed by the results obtained in cases of lupus, rodent ulcer, and superficial septic ulcers. One case of asthma was distinctly improved.—Dr. E. P. CUMBERBATCH had used the S rays with success: 1. In a case of intractable eczema of the dorsum of the hand, cured by 15 exposures. 2. Lupus of the leg cured by 30 applications. 3. Rodent ulcer of the lower eyelid. A previous application of radium had caused the ulcer to heal, but ulceration reappeared, and six applications of S rays caused it to heal again.—Major E. G. FFRENCH, R.A.M.C., had treated cases of syphilis at Rochester-row by means of the light. Primary sores healed ten days sooner if the light treatment was combined with salvarsan than if salvarsan was used alone. Condylomata disappeared quickly. Gummatous ulcers of the leg previously resistant made rapid progress. The cicatrices were satisfactory.—In reply to a question Mr. HARMER stated that he had not tried the Simpson light in cases of atrophic rhinitis.

Dr. IRWIN MOORE: 1. A case of Chronic Suppuration of the Left Frontal, Ethmoidal, and Maxillary Sinuses. The patient had suffered for eight years from severe pain over the left frontal sinus with a constant discharge of pus from the left naris. When operated on in March, 1911, the left frontal sinus was full of pus. A complete Killian operation was performed and the roof of the orbit was removed. The ethmoid cells were removed, together with many polypi and degenerated mucosa from the left antrum. When shown in May, 1911, there was no discharge and the headache had disappeared. Three months later a Caldwell Luc operation was performed on the left antrum on account of a recurrence of the purulent discharge. A further recurrence of pain and discharge was treated in June, 1912, by vaccine with some relief. In October, 1913, in consequence of intense infra-orbital neuralgia, the bony canal surrounding the infra-orbital nerve was partly removed, with great relief of pain. Since January, 1914, discharge and pain had continued with only slight variation from day to day, and no treatment gave any relief. At present there was atrophic rhinitis.—Mr. J. F. O'MALLEY thought the continued discharge was due to a cell beneath the orbit and not to atrophic rhinitis.—Dr. DAN MCKENZIE thought the patient would get well if left alone.——2. A Naso-pharyngeal Polypus (Choanal Polypus) originating in the Right Maxillary Antrum. The patient, a male aged 42, had a growth originating in the right maxillary antrum extending through the middle meatus into the naso-pharynx. On June 24th, under chloroform, the protruding post-nasal portion of the growth was removed piecemeal through the mouth by means of Luc's forceps. This portion of the growth was of a hard consistence and firmly attached to the choanal margin and the spheno-ethmoidal recess, and it had absorbed a portion of the posterior edge of the vomer. The intranasal portion of the growth was removed in a similar way. The opening into the maxillary antrum through the canine fossa was next enlarged, and the antral portion of the growth was found to be soft and necrosed. This was removed, together with the antro-nasal wall, which had been partly absorbed by the growth. The turbinals and ethmoidal cells had also been absorbed, so that the operation converted the left nasal fossa into one large cavity. Professor Shattock

reported: "The histological diagnosis of the neoplasm is a soft fibroma in which œdema has occurred."

Dr. IRWIN MOORE read the Final Notes on a case of Malignant Stricture of the Œsophagus, situated ¾ inch above the sternal notch. The case was shown at the section meetings on Nov. 6th, 1914, and May 7th, 1915, to illustrate the benefits of Dr. William Hill's styletted feeding tube. Soon after the last meeting the tube became blocked, and as it was impossible to insert another tube gastrostomy was performed. The patient only survived 18 days. The case is interesting in showing that a patient may be kept alive and satisfactorily fed on semi-solid foods, per vias naturales, by means of this tube. The loss of weight was slow, being only 1 st. 8 lb. during the eight months, compared with 2 st. 9 lb. during the two months preceding the intubation. The operation of gastrostomy was postponed for eight months, during which time the patient was able to enjoy his food and attend to his business as a traveller. The tube has a gradual mechanical dilating effect on the stricture. After the tube had been inserted for seven weeks and then removed the patient was able to swallow food without any tube for nine days. The tube should not be left in too long before a fresh one is inserted. A change every three months appears desirable.

Mr. STUART-LOW: 1. A soldier who was wounded on June 1st, 1915, at Ypres, by a bullet which entered over the right side of the nasal bridge, passing through the right maxillary antrum, the roof of the mouth, the tongue, and the left ramus of the lower jaw, and out at the left side of the larynx. The jaw was fractured, and having been very skilfully wired in place by Dr. James, had united firmly. The right antrum was quite dark on transillumination for some weeks, no doubt due to blood-clot, but was now clearer. 2. A soldier, wounded in Flanders by a bullet which entered on the right side of the neck and passed out on the left side. It must have injured the larynx, as he had now a web occupying nearly half of the glottis and greatly impairing his respiration and vocalisation. An expression of opinion as to the best method of removing this membrane was desired.—The PRESIDENT advised laryngo-fissure in order to remove the web.—Dr. MCKENZIE thought that diathermy would be the best way of treating the web.

Dr. MCKENZIE: Paralysis of the Left Vocal Cord from bullet wound of the neck. The patient, an officer, was wounded in May last in Gallipoli. Immediately after receiving the wound he became aware that he could only speak in a whisper. The wound healed up in three weeks and the voice returned so that he could now converse comfortably, although shouting soon tired it. Laryngoscopy showed the left cord to be paralysed. The bullet entered the neck opposite the fourth cervical vertebra, and emerged at the anterior border of the sternomastoid, midway between the upper edge of the thyroid cartilage and the hyoid bone. At this level it must have been the left vagus itself which was severed, and that without any obvious injury either to the carotid vessels, to the internal jugular vein, or to the sympathetic cord. The pulse was normal in rate and rhythm.

Major PERRY GOLDSMITH: 1. Traumatic Paralysis of the Left Vocal Cord. 2. Bullet Wound of the Left Mastoid and Left Orbit and Detachment of the Retina.—Dr. WATSON WILLIAMS would have no hesitation in opening up the affected sinuses, particularly the sphenoids.—Dr. DUNDAS GRANT also advised draining the affected sinuses.

Dr. ANDREW WYLIE: Bullet Wound of the Nose closed by Plastic Operation.

Mr. G. W. BADGEROW: Swelling in the Roof of the Mouth.—The PRESIDENT thought it was a case of tumour of the palate.

Dr. L. H. PEGLER: 1. Shrapnel Wound of the Nose and Cheek. 2. Empyema of the Right Frontal Sinus.

SECTION OF ELECTRO-THERAPEUTICS.

Reaction Testing of Muscles.—Organisation of Electrical Departments in Military Hospitals.

A MEETING of this section was held on Nov. 19th, Dr. W. IRONSIDE BRUCE, the President, being in the chair.

Dr. E. P. CUMBERBATCH read a paper in criticism of the Reaction Testing of Muscles and the Interpretation of the Results with Reference to Electrical Examination of Nerve Injuries in War. He contended there was need for a revision of ideas held on the subject of the reaction of degeneration. The electrical reactions of muscle were tested for two purposes: First, to ascertain whether the lesion in a given case was in the upper or in the lower motor neuron; secondly—a much more difficult problem—to try to estimate the severity of the lesion. The first difficulty lay in the absence of a method for accurately estimating the strength of the current being used. In a number of cases which showed the reaction of degeneration he had found that if the test were repeated with a stronger faradic current the muscle responded. Hence such cases had only partial reaction of degeneration, and, according to present ideas, the prognosis was more favourable. The question as to what should be the strength of faradic current used could not be answered, because no means of measuring that strength was available. And to state that the reaction of a particular muscle was weak did not convey a definite truth, for the reason that the strength of the stimulus being applied was not known. In normal health different muscles responded in varying degrees and with varying briskness. A cold muscle contracted more slowly than a warm one: a girl with chilblain circulation showed a sluggish response in the intrinsic muscles of the hand; but when the hand was warmed by diathermy there was quite a brisk contraction to the same strength of current. With regard to indications as to the severity of a lesion, if a muscle showed reaction of degeneration it meant that it was the seat of a more severe lesion than if the reaction were normal; but nothing beyond that could be deduced. The injury to a nerve might be so slight that it recovered quickly, yet until that recovery it would show reaction of degeneration, and he had abundant evidence that reaction of degeneration could be elicited in a muscle having good voluntary power. He quoted illustrative cases. An idea of the nerve lesion existing in a case when reaction of degeneration was obtained could be derived by first estimating the degree of degeneration in the muscle. Muscle responded to impulses varying from 1/24,000th of a second to 1/200th of a second; and the Lewis-Jones condenser provided the clinician with stimuli from 1/24,000th of a second to 1/200th, and even down to 1/20th second. In complete reaction of degeneration there were all varieties, down to 1/20th of a second. But he did not think the results obtained in testing muscle reactions were of much assistance in estimating the severity of the lesion, for reasons which he detailed. Many paralysed muscles were very excitable to the galvanic current; and he believed that to be an evidence that the particular nerve injury was not severe. He submitted that the best indications of the condition of a nerve by electrical methods were derived by testing the nerve itself. If one stimulated the nerve at a point above the position of the injury and the result was a contraction of muscles, that was evidence that there were enough conducting fibres to cause the muscles to contract to render an operation unnecessary. Another line of investigation would be for the tester to be present at the operation and test the nerve trunks while they were exposed. Erb's definition of reaction of degeneration Dr. Cumberbatch criticised, and expressed the hope that it would disappear from future text-books. It was not a correct term, for it was not a degeneration. There was, he contended, need for experimental investigation of the reactions of white muscle and of red muscle. This had been done comparatively in animals, but he did not know that it had been mentioned in connexion with the human subject. It appeared likely to throw further light on the subject of the reaction of degeneration.

Captain F. HERNAMAN-JOHNSON gave his experiences in nerve testing during 15 months at the Aldershot military hospital in some 200 cases. He expressed his entire agreement with most of Dr. Cumberbatch's contentions, and spoke highly of the Lewis-Jones condenser as an indicator of the severity of nerve lesions and as a guide to prognosis. He had designed a modification of the apparatus to increase the range of the original one.

Captain F. BAILEY agreed with Captain Johnson that the condenser method was an eminently practicable one. The precautions in testing mentioned by that gentleman so as to eliminate error were very reasonable, and he had arrived at them quite independently himself. He hoped, with him, that medical electricians would all work to one standard so that results obtained should be comparable.

Dr. W. J. TURRELL thought sufficient stress was not usually laid on the amount of resistance encountered when testing, and pleaded for a standardisation of the sizes of the pads. Not only cold muscles, but a dry skin, modified the response obtained. It was his custom, when a limb was cold or very dry, to wrap a hot cloth around it before testing.

Dr. T. GRAINGER STEWART believed that neurologists in general had not, for many years past, attached the importance to nerve testing which, on the instruction of the textbooks, the medical profession as a whole had done. His own idea, though he had not employed condenser methods, was that electrical testing only helped in so far as it was associated with repeated clinical observation. In the cases of nerve injury seen in this war, prognosis and the response obtained from electrical testing depended very much on the time which had elapsed since the receipt of the injury. Faradism he considered to be by far the most accurate method of testing the condition of a nerve.

Mr. BURKE related his experiences in muscle and nerve testing at the County of London Hospital, Epsom, his conclusions being similar to Dr. Cumberbatch's, that electrical reaction testing in itself was of very little value. The value of the condenser methods of testing had not yet been settled.

Dr. CUMBERBATCH replied.

Dr. ETTIE SAYER read a paper entitled "The Organisation of Electrical Departments in Military Hospitals." The paper contained an account of the organisation and electrical equipment of some French military hospitals, and suggested a similar state of affairs for our own wounded, with a properly equipped staff of radiologists.

SECTION OF DERMATOLOGY.

Exhibition of Cases.

A MEETING of this section was held on Nov. 18th, Dr. J. H. STOWERS, the President, being in the chair.

Dr. GRAHAM LITTLE reported further on his case of ? Sporotrichosis shown at the last meeting. The prevailing organism found in the lesions was bacillus pyocyaneus, a vaccine of which has so far had no beneficial influence.

The following cases were exhibited :—

Dr. GRAHAM LITTLE : 1. Chronic Ulceration of Leg. The patient, a man, had soft sores on the penis 13 years ago; these were followed by a bubo in the groin, which burst, and from that time ulcers spread up over the abdomen and down the thigh. Extensive scarring was left where the ulcers had been, and the ulcers themselves were undermined, typical of ulcus molle, only on a larger scale.—Dr. J. J. PRINGLE and Mr. J. E. R. MCDONAGH both considered it to be a typical case of ulcus molle serpiginosum. So far as treatment was concerned, active interference was deprecated, iodine internally and externally having proved in the past to be the most efficacious. Mr. McDonagh considered the condition was due to an altered habitat of the organism. ——2. Granuloma Annulare in a young girl. The lesions were on the backs of the legs. There was a strong family history of tuberculosis, but the child showed no evidence.—Dr. PRINGLE and others agreed that granuloma annulare and erythema elevatum diutinum were two names for the same condition. The spontaneous disappearance of the lesions was referred to, and it was mentioned that lesions, though rarely, did appear on the face.—The PRESIDENT referred to two cases he had seen in which the ears were involved.

Dr. G. PERNET: Exuberant Lupus Vulgaris with Epithelioma on the Forehead in a woman aged 50. The patient had never had X rays, therefore the epithelioma had occurred independently. The case was widely discussed and the general impression was that X rays, if properly applied, were still the best treatment for lupus. An overdose certainly increased the tendency for a malignant growth to appear.—Dr. A. DOUGLAS HEATH stated that pyogenic granulomata also occurred on a lupus base, and that he had had a case of sarcoma.

Dr. A. EDDOWES: Case of Folliclis in a woman aged 21. There was no family history of tuberculosis, but the patient had had enlarged glands since the age of 10. The present eruption, which was most marked on the arms, had persisted for one and a half years.—Dr. PRINGLE urged that the name "folliclis" should be dropped and supplanted by that of "papulo-necrotic tuberculide."

Reviews and Notices of Books.

Exercise in Education and Medicine.

By R. TAIT MCKENZIE, M.A., M.D., &c. Second edition. London and Philadelphia: W. B. Saunders Company. 1915. Pp. 585. Price 18*s.* net.

THE first edition of this book was reviewed in THE LANCET of April 16th, 1910. We then expressed our high opinion of its value. All that we then said of it still holds good, and now that a second edition, considerably altered, has appeared it is desirable in welcoming it to notice certain features. The principal change in the new edition is the expansion of the section on the physiology of exercise from one chapter to four, and here the statement that "second wind" is due to "a readjustment of elimination to the increased production of waste," to which we took exception, has been allowed to stand.

The book is most comprehensive, for it deals with systematic exercises and games from every point of view, but more particularly from the national and medical standpoints. The numerous illustrations with which it is adorned demonstrate the extent to which American games are systematised. The influence of German immigration is probably shown here also, for the trainer, or drill-sergeant in disguise, has more importance in American schools and colleges than he has in British institutions of the like sort. We all know this, but we have never seen it commented upon as somewhat remarkable, considering that we have been apt to associate America with extreme individualism in general. Dr. McKenzie gives an interesting historical account of modern gymnastics and of the struggle between German and Swedish principles, a struggle which is not yet quite decided. It appears as though Germany would win in America, while in England Swedish methods are certainly more popular, and are the basis of the physical training of both the navy and the army.

Not the least interesting parts of the book are those dealing with the use of exercises in the education of the blind and of the deaf-mute. In both classes the introduction of games and of some form of gymnastics has had a marked effect in quickening the intelligence, and the same applies to the case of the mentally deficient, who are well known to enjoy and to benefit by training in the manual arts. The sections on the more strictly medical applications of exercise and massage are full and useful and include probably all the known systems of movement cure for nervous and circulatory disorders.

Ten-Minute Talks to Mothers by an M.O.H.

By H. CAMERON KIDD, M.B. Lond., F.R.C.S. Eng., Medical Officer of Health of the Urban Districts of Bromsgrove and North Bromsgrove. Published by the Urban District Councils of Bromsgrove and North Bromsgrove.

AT the present time, when so many of our countrymen are losing their lives in defence of the Empire, it is more than ever important that special care and attention should be devoted to the rearing of infants and young children and to the prevention of infantile mortality, which is, unfortunately, only too heavy among the artisan class in many of the industrial centres of Britain. With this object in view the Notification of Births (Extension) Act,

1915, has been passed, which provides that on and after Sept. 1st, 1915, the original Act of 1907 shall extend to and take effect in every area in which it is not already in force. This Act makes it the duty of the father of the child and of any person in attendance on the mother at the time of the birth to give notice in writing of the birth to the medical officer of health of the district. In order to encourage local authorities to follow up and make use of the information thus obtained in a greater degree than has formerly been the case, grants have been voted by Parliament in aid of expenditure incurred by local authorities or voluntary agencies in connexion with institutions provided for maternity and child welfare. Such grants will be made in aid of expenditure in respect of clinics, dispensaries, or other institutions primarily concerned with the provision of medical and surgical advice and treatment, as well as in respect of salaries of health visitors and other officers engaged for this work, and will be administered by the Local Government Board. Grants to institutions of the nature of schools for mothers, the object of which is primarily educational, which provide training and instruction for mothers in the care and management of infants and little children, and which may include systematic classes, or home visiting, or infant consultations, will be administered by the Board of Education. In a circular dated July 30th, 1914, issued by the Local Government Board to local authorities, it is stated that—

> Up to the present local authorities, in their infant welfare work, have concerned themselves more especially with the child in its first year of life; the matter is, however, one which needs to be dealt with on a more comprehensive basis, and it is clearly desirable that there should be continuity in dealing with the whole period from before birth until the time when the child is entered upon a school register. Extension of the existing work is accordingly needed in two directions: on the one hand, it is necessary that measures should be taken for securing improved ante-natal and natal conditions, and on the other, provision should be made for continuing the work in relation to children beyond the first year of life.

Much importance is attached by the Local Government Board to home visitation by health visitors and to the formation of maternity centres, in charge of a medical officer, to which expectant mothers and mothers with infants and little children may be referred for advice and treatment. Amidst all this activity for the welfare of our future citizens the appearance of literature dealing with the subject is not surprising. The pamphlet under review has been published by the councils of the urban districts of Bromsgrove and North Bromsgrove in the hope that its distribution may be of service in advising mothers on the important subject of the rearing of infants and the care of children. It comprises a series of nine short lectures which were delivered to a class for mothers and are now collected in the form of a booklet. Dr. Cameron Kidd is to be congratulated upon the manner in which he has put a great deal of sound advice and useful information into language which will be readily understood by the class of persons for whom the lectures are intended. The advice given is based on a personal experience of 27 years' general practice, and the methods advocated are such as can readily be carried out without undue difficulty or expense in the poorest home and by the least experienced mother. The value of the publication is enhanced by a short summary of the chief points requiring attention which appears at the end of each lecture and by a full index of contents. We believe that this little book will be found useful to all who are interested in the rearing of children and to none more than the mothers themselves.

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1. *Quantitative Laws in Biological Chemistry.*

By SVANTE ARRHENIUS, Ph.D., M.D., LL.D., F.R.S., Nobel Laureate Director of the Nobel Institute of Physical Chemistry. London: G. Bell and Sons, Limited. 1915. Pp. 164. Price 6*s.* net.

2. *Practical Organic and Bio-chemistry.*

By R. H. A. PLIMMER, Reader in Physiological Chemistry, University of London, University College. With coloured plate and other illustrations in the text. London: Longmans, Green and Co. 1915. Pp. 635. Price 12*s.* 6*d.* net.

1. THIS book on "Quantitative Laws in Biological Chemistry" is founded on the Tyndall lectures given by the distinguished author in the Royal Institution in May, 1914. It contains a short résumé of his own work in the field, supplemented by the investigations of others on neighbouring ground. He pleads for more attention to quantitative laws, saying that "as long as only qualitative methods are used in a branch of science, this cannot rise to a higher stage than the descriptive one." This, of course, is true, but in the region of bio-chemistry quantitative methods are very difficult when based on purely chemical considerations. As the author points out, substances are often unstable, they are often resolved into new ones on warming, they may be rapidly destroyed by acids or bases, and their purification becomes very difficult. Dr. Arrhenius has been led, therefore, to abandon in part "common chemical methods" and to appeal to the resources of physical chemistry, which "allows us to follow quantitatively the influence of temperature and of foreign substances upon these interesting organic products, which are of the greatest importance in industry, in the physiological processes of daily life, and in diseases and their therapy." Coming to immuno-chemistry, chemical analysis, he says, leaves us absolutely helpless. The antigen and the antibody are cases in point. It is possible, for example, to discover an antigen amongst an immense number of organic substances by means of its specific antibody. The blood of different animals, the secretions of different bacilli, may thus be discriminated from each other with certainty. And "it is physical chemistry which gives us the mighty instrument for these investigations. ..... Active immunity throws much light on the progress of illnesses produced by micro-organisms," and he concludes, "it is a very promising feature that we are able to treat the content of antibodies during and after the illness in a strictly quantitative manner, and that we have succeeded in subjecting this extremely important phenomenon to calculations which agree as well with the observed facts as with ideas conceived for the explanation of other parts of chemical science." These observations serve to show what an interesting field the author traverses, and the scientific spirit in which he explores it.

2. The previous edition of "Practical Organic and Bio-chemistry" was issued in 1910 under the title "Practical Physiological Chemistry." The author has been induced to alter this title to the one above for the very good reason that the basis of the book is organic chemistry, and the subject is treated also from the botanical side. The term bio-chemistry is therefore substituted for physiological chemistry,

which, as the author says, is a term too often restricted to the aspect of the animal side of the subject. In its new form the book shows several important extensions; there are new sections upon organic chemistry and organic substances found in plants, together with a description of the methods used in more advanced work. Primarily the book is intended for the medical student, though he will find in it more material than he immediately requires. There is no objection to this plan; on the contrary, we welcome it, as it takes the book out of the mere examinational class and places it on a real educational plane. Assistance, however, is given to particular needs by printing essentials in large type and the botanical and more advanced portions in small type. The practical sections of the book are very valuable and care has been taken to employ only that analytical procedure which is up to date and which gives trustworthy results and convenience in manipulation. The treatment of the subject is very thorough, and altogether the book will be found an unerring guide to the practical study of bio-chemistry.

LIBRARY TABLE.

The Psychoneuroses and their Treatment by Psychotherapy. By Professor J. DEJERINE, Professor of the Clinic for Nervous Diseases of the Faculty of Medicine of the University of Paris; and Dr. E. GAUCKLER, formerly Interne of the Hospitals of Paris. Authorised translation by SMITH ELY JELLIFFE, M.D., Ph.D., Adjunct Professor of Diseases of the Mind and Nervous System, Post-graduate School and Hospital, New York. Second English edition. London and Philadelphia: J. B. Lippincott Company. 1915. Pp. 395. Price 18*s.* net.—This second English edition of Dejerine and Gauckler's excellent work on the treatment of the psychoneuroses is identical with the first, which we reviewed last year. There is little we need add to the hearty commendation we then expressed of its merits. Increasing familiarity with the subject will lead not a few workers, we believe, to agree with the words of the translator, that "the reading of this book will show how many patients may be treated and cured without the more detailed analyses elaborated to meet more complex situations."

Diseases of the Nervous System. By H. CAMPBELL THOMSON, M.D. Lond., F.R.C.P. Lond., Physician to the Department for Diseases of the Nervous System and Lecturer on Neurology, Middlesex Hospital; Physician to the Hospital for Epilepsy and Paralysis, Maida Vale. Second edition, revised and enlarged. With 10 colour and 12 black-and-white plates and 120 figures in the text. London, New York, Toronto, and Melbourne: Cassell and Co., Limited. 1915. Pp. 553. Price 10*s.* 6*d.* net.—The second edition of this concise and well-written text-book has been carefully revised throughout and expanded by some 70 more pages. Among the additions to be noted are new chapters on the general functions of the brain, the examination of the higher functions of the nervous system by the application of experimental psychology, the sympathetic system, and the paths of infection of the central nervous system. The author further gives evidence by his interpolations on a smaller scale that he has kept himself abreast of the most recent work in neurology, and he has utilised what is likely to be of service to the student and practitioner, while supplying much information the application of which to practice is not so obvious. In its present form Dr. Campbell Thomson's text-book is assured of wider appreciation by reason of its enhanced usefulness.

The Cure of Self-Consciousness. By JAMES ALEXANDER. London: Simpkin Marshall. 1915. Pp. 151. Price 3*s.* 6*d.* net.—The writer of this book declares it is published to meet the requirements of a large class of people, young people doubtless predominating, who suffer from self-conscious fears. From the assertions that "the root cause of self-consciousness is fear, in some form or other," and "the secondary causes—timidity, shyness, bashfulness, stammering, blushing," we are not surprised to read later that the author "guarantees" that no sufferer will fail to conquer his fears if he will carry out the instructions in Part II. of the book. For facial control we have such rules as "keep the lips gently compressed and gaze steadily" (in front of a mirror) "at a point immediately between the eyes, and at the same time feel you are perfectly cool, calm, and self-possessed." Again, "stand in front of a wardrobe mirror. Draw yourself up erect with your hands down by your sides, and then use auto-suggestion. Say to yourself, 'I feel much braver to-day. I feel more resolute, more courageous, I have more confidence in myself.' Make phrases like these and repeat them with great earnestness." And so on. Much of the counsel herein contained is no doubt apposite, but the investigation of self-consciousness is superficial, and the procedure recommended for a "way out" is of limited applicability.

Rapport sur les Opérations du Service Vétérinaire Sanitaire de Paris et du Département de la Seine (1914). Par H. MARTEL, Docteur à Sciences, Chef de Service. Paris: "Le Papier," Avenue du Pont-de-Flandre. 1915.—The report of Dr. Martel, the Chief of the Veterinary Sanitary Service of Paris and the Department of the Seine, is interesting to medical men, especially those engaged in public health work, as there are numerous diseases of animals which are transmissible to man, or of which there is a common origin for each. The veterinary surgeon has the advantage over the medical man in that he is able to apply the stamping-out method, and to do it drastically. It is gratifying to read that rabies in the dog is now rarely met with, four cases only having been confirmed in 1914, whilst amongst the numbers of people treated at the Pasteur Institute there have been no deaths since 1905. As there were 208,706 dogs in Paris and district, for which licences were taken, the result must be classed as excellent. Foot-and-mouth disease broke out in six places, but only 163 animals were affected, and these were readily dealt with. Tuberculosis was again observed to be more prevalent in the breeds which were kept for milking purposes, and the results of the methods employed to combat its ravages were not as successful as had been hoped. In all the Government spends each year more than 1,500,000 francs in efforts to stamp out this disease alone. The contest with glanders has been much more satisfactory, thanks to the constant use of mallein as a test agent; and in connexion with this it is worth noting that during the past 12 months the intra-dermo-palpebral method has in a great measure superseded the hypodermic cervical test as a method of diagnosis. In the abattoirs only four cases were discovered out of a total of 43,430 horses killed for human food. Statistics of numerous other diseases, including those of the pig and sheep, are dealt with. The report occupies 160 pages, all of which are valuable reading to those interested in the subject.

THE LANCET.

LONDON: SATURDAY, DECEMBER 4, 1915.

Factories and Workshops and the War.

THE annual report of the Chief Inspector of Factories and Workshops, Sir ARTHUR WHITELEGGE, was published last week, and provides many interesting details connected with the great change that has taken place owing to the war in the administration of this department. It may easily be imagined that the routine machinery, which worked smoothly enough in normal times, required considerable readjustment and adaptation under the severe pressure put upon our factories and workshops by the enormously increased demands for war materials. At first several industries were brought to a standstill, then came a demand for labour in other directions. This is well illustrated in Chapter IV. of the report on "Women and Girls in Industry," to which subject, by the way, more attention has been devoted than to any other. Old factories have been adjusted to new processes, workshops transformed into factories by addition of power, new factories built, and necessary products revived which had been allowed to lapse out of home control into the hands of nations now cut off from us by war. Women and girls have adapted themselves to these new conditions in old workrooms, as well as to new processes in new workrooms. Further, large numbers of them have been drawn in who never previously worked in a factory or workshop, including girls who have been hitherto entirely engaged in their parents' homes, as well as waitresses, shop assistants, clerks, domestic servants, and unemployed women from miscellaneous women's industries. All this great opening for women's work, of course, arose out of the increasing shortage of men workers and the great demand for war materials. It is agreeable to learn that altogether the war has "acted as a wonderful stimulant to enterprise," and that a considerable number of new industries calculated to replace goods formerly imported from Germany has sprung into existence on all sides.

As regards the effect on health of the greatly increased hours, Miss ANDERSON, the Principal Lady Inspector of Factories, reports that it is too early yet to attempt a serious estimate, but she considers that, up to date, a new power of resistance to fatigue has shown itself in industrial women in a way comparable with the spirit of their men at the front. They have taken on the extra labours without relaxation from their home cares, and yet in some cases they can manage to do "a bit of knitting for the soldiers." Still, there is evidence that the strain is telling in some directions, for a Yorkshire firm working overtime continuously for some months have found it absolutely necessary to stop the process for a week, "as the strain was becoming too great and the number absent through illness was so large." The problems connected with the reasonable apportionment of overtime appeared well-nigh overwhelming. At first there was a fear of unemployment happening, a fear which was not only not realised, but which was quickly followed by the difficulty of how to get adequate supplies of workers. Next had to be determined what the need of the different branches of each industry was, what amount of overtime could properly be worked in each, and what scale of hours was likely to give the largest amount of production. Schemes were eventually formulated, each adjusted to the different nature and kind of work in hand. The experience of Mr. G. BELLHOUSE, the Superintendent Inspector of Factories, with regard to men workers, agrees with Miss ANDERSON'S with regard to women workers as to the effects of overtime upon the health of the workers and upon production. "Looking at this question as a whole," he writes, "it is probably safe to say that, whatever may be the injurious effects of so prolonged a strain, there is at present no sign that workers have been injuriously affected." He adds also that "there can be little doubt that the knowledge that they were taking an active share in the struggle in which the country is engaged, and the feeling that they were thus 'doing their bit' has enabled workers to carry on under conditions that in normal times would be insupportable." This matured opinion on a difficult subject is very satisfactory.

Dr. T. M. LEGGE, the Medical Inspector of Factories, contributes a report on tetrachlorethane poisoning. This substance has been in very large request owing to the manufacture of aeroplanes suddenly assuming large dimensions on the outbreak of the war. It is used in the varnish for covering the wings of aeroplanes. The possible perils in connexion with this new industry were fully investigated by Dr. W. H. WILLCOX, and a paper on "An Outbreak of Toxic Jaundice due to Tetrachlorethane Poisoning" appeared in THE LANCET, March 13th, 1915. Some amelioration of the evil has been effected by reducing the amount of tetrachlorethane in the mixture and, to some extent, by the use of substitutes, while exhaust fans have been provided at the floor level to remove the vapour, which is heavier than air, directly into the outside atmosphere. We mention Dr. LEGGE'S subsidiary report not only because it is valuable, but because it is evidence of the careful and far-reaching character of the whole document, which reflects great credit upon the department. Sir ARTHUR WHITELEGGE and his staff may be warmly congratulated upon the earnest way and the splendid spirit with which they approached the difficulties which presented themselves with

such startling suddenness. Their work, moreover, has been achieved in spite of lending several of their officers for special emergency war service, while 30 inspectors and assistants, and 32 clerks are serving with the Forces, and though with regard to certifying surgeons the data are not complete, it should be added that by the end of 1914 long special leave for military service had been allowed to 87 of these officers.

Spinal Lesions in War.

IN his first Goulstonian lecture at the Royal College of Physicians of London on Nov. 16th Lieutenant-Colonel GORDON HOLMES, R.A.M.C.(T.), based his observations on "Acute Spinal Lesions, with Special Reference to those of Warfare" on the abundant clinical material of a base hospital, supplemented by 60 necropsies in which the spinal cord had been stained and examined microscopically. His general conclusions from a careful analysis of the data were that: (1) structural lesions in the spinal injuries of warfare are rarely sharply limited or circumscribed, whilst the level of the lesion often does not correspond with the area of maximum clinical damage; (2) it is difficult to deduce the exact anatomical lesion, since the clinical damage is of such irregular nature and occurrence; and (3) secondary changes may afterwards modify the clinical picture. A pathological novelty is the occurrence in more than half the cases of cylindrical cavities developing under pressure, generally in the dorsal columns, for four or five segments away from the lesion and connected therewith by a small track of softened or œdematous tissue. These cavities may track both up and down, usually one or other, and then more frequently down, increasing in size on the same principle as a retention cyst, and terminating in a rounded or blunt end. The origin of the cavities seems still to be obscure, but they are certainly not due to infection, or hæmorrhage, or even to a vascular lesion, as the distribution is not that of any blood-vessel. On the contrary, their site is rather at the watershed of two main groups of afferent vessels.

In the second lecture Colonel HOLMES dealt with the clinical manifestations of spinal lesions. The level of the lesion is indicated both by sensory and motor symptoms—in civil life greater attention is usually paid to the sensory symptoms, but the lecturer insisted rather on the motor symptoms as indicating the level of the lesion, since owing to the oblique course of the sensory fibres in the cord the interpretation of the signs was more liable to error. He attached considerable importance to the appreciation of the vibrations of the large tuning-fork as indicating the level of the lesion on the trunk. He discussed the significance of the prolonged absence of the knee-jerk which occurred after spinal injuries in cases in which the lesion of the cord was presumably not complete. He said that in unilateral lesions of the cervical region the knee-jerk on the homolateral side was often absent or depressed for a long time. In certain cases in which the lower dorsal and upper lumbar segments were involved he had noticed automatic rhythmic movements of the legs. These movements consisted in the flexion and extension of the legs alternately. The sequence could not be altered by any cutaneous stimulus, but the rate could be increased by stimulation on the inner side of the thigh. Lesions of the cervical region of the cord give rise to a group of symptoms connected with the sympathetic, and lesions about the level of the sixth, seventh, and eighth cervical and first dorsal segments produce a condition of collapse with cold skin, in which a remarkable lowering of the temperature occurs, so that a point as low as 78° F. has been noted, and a temperature of 80°–84° has been observed for some days. In association with this the pulse-rate is slowed, respiration may fall to 9 per minute, and very small quantities of urine will be passed. There is a state of mental lethargy. This condition was compared by Colonel HOLMES to hibernation in animals. The temperature in one case rose from 80° to 105° in less than 24 hours. The lecturer referred in this lecture also to the hyperpyrexia in lesions of the upper cervical segments, and to the frequent occurrence of vomiting in lesions of the mid-dorsal region of the cord, clinical symptoms that are not very easy to explain entirely.

The third lecture dealt with the disturbances of sensation produced by spinal lesions. Colonel HOLMES dealt with the observations on the course of sensory fibres within the cord, and especially with the work of BROWN-SÉQUARD, PETRÉN, HEAD, and THOMPSON, who, in addition to himself, had shown from clinical observations on man that afferent impulses for pain and temperature passed up in the crossed contralateral tract, while sense of position, compass points, and vibration passed up in the dorsal homolateral tract, both tracts being open to touch. The lecturer described in some detail two cases exhibiting the Brown-Séquard phenomenon, one at the level of the fifth cervical and the other at the level of the fifth dorsal. He then referred to the oblique course of the crossed fibres. In the mid-dorsal region the fibres for pain cross quickly in about one segment, he said, whereas temperature takes two segments, and touch three segments to complete the decussation. In the cervical region the obliquity is more marked, so that the decussation of the various fibres is not complete for three to four segments of the cord. Colonel HOLMES had noted cases of extensive lesions in the cervical region in which sensation was preserved over the sacral areas around the anus; and he had seen cases in which return of sensation had first occurred in this region. He explained this occurrence by the view that the afferent fibres from the sacral area after their decussation lay in the most peripheral portion of the antero-lateral tract and were thus less liable to

injury by lesions occurring in the centre of the spinal cord. Anomalous dissociation of sensation he explained in certain cases as due to incomplete lesion of the dorsal columns of the cord, and he described an interesting group of cases in which the loss of sensation over the hand and forearm corresponded neither to the distribution of a peripheral nerve nor to a nerve root nor to a segmental area of the cord. These cases he explained by the grouping of root fibres within the cord according to the segment of the limb from which they came. With regard to the occurence of spinal pain—that is, pain referred to one or both sides of the body below the level of the injury, and to the hyperæsthesia that is so frequently seen in the early stage of these spinal injuries—he pointed out that both symptoms may be in the first place due to irritation of the posterior roots at the level of the injury, but that in many cases intramedullary changes must be the origin.

Annotations.

"Ne quid nimis."

HUGHLINGS JACKSON'S VIEWS OF APHASIA.

THE double number of *Brain*,[1] just published, is one of unusual interest and importance. It is devoted to a study of Hughlings Jackson's views of affections of speech, and consists of three divisions, the first being an account by the editor, Dr. Henry Head, of Jackson's views on speech, the second being reprints of important parts of Jackson's writings on this subject, and the third a complete bibliography of his works on speech. It may be said at once that the volume is one which deserves, and will no doubt receive, the most careful study of every neurologist. Little has been written in this country of late years in reference to speech which has made any strong appeal to those interested in the subject. Various diagrammatic schemes have been submitted from time to time, and some teachers have endeavoured with commendable, if misdirected, force and energy, but no very striking success, to explain cases of aphasia by the aid of these schemes. Others have desisted in despair and have confessed to themselves that some cases were not to be explained by any of the schemes. We venture to think that the effect of this volume will be to lead us back to the fundamentals of the subject, and unless we are much mistaken a goodly edifice is not unlikely to arise on the foundations here provided. In his article describing and summarising Jackson's views, Dr. Head points out that ever since Broca showed the close connexion between speech defects and lesions of the third left frontal convolution the fashion has been to endeavour to explain every case in which speech was affected by some definitely placed brain lesion. Jackson recognised that all the phenomena are primarily psychical, that destructive or negative lesions cannot produce positive symptoms, and that therefore positive symptoms such as the recurring utterances of speechless patients cannot be the result of loss or defect of function, but that these and similar symptoms occur during activity of lower nervous arrangements which have escaped injury. He also pointed out that each case of speech affection exhibits two aspects—a negative, as shown in inability to read or to write, and a positive, as shown in the ability to write his name (an almost automatic act), to swear, or to utter other emotional expressions. Jackson divided healthy language into two distinct forms which might be separated by disease: (1) Intellectual—i.e., the power to convey propositions; and (2) emotional—i.e., the ability to exhibit stress of feeling. The former suffers in disease and in this relation language includes not only speech but also reading and writing, for written or printed words are "symbols of symbols"; the latter is conserved throughout. He also pointed out that patients with affection of speech fall into two groups—severe cases in which the patient is speechless or nearly so, or in which speech is very much damaged, and cases in which there are plentiful movements but wrong movements, or plenty of words but mistaken words. The general law underlying these disturbances of speech is that voluntary power is diminished with retention of the power to carry out the same movement in an automatic manner, as illustrated in the case of the speechless patient who was unable to protrude his tongue when asked to do so, but could perform the movement perfectly in the automatic action of licking a crumb from his lips. Reference is also made to the manner in which Jackson differentiated superior and inferior speech, superior speech being that by which a proposition is expressed, inferior speech being perhaps in the form of a proposition, but used emotionally in a largely interjectional manner. Thus the phrase "come on"—a recurrent utterance in an aphasic patient, has no propositional value. It is a mere interjection. A further section of Dr. Head's paper concerns speaking and thinking. Speech consists not of single unrelated words, but of words referring to one another in a particular manner—i.e., to speak is to propositionise. This propositionising occurs not only when we tell others what we think, but when we tell ourselves what we think; which, of course, means that internal and external speech are identical, except that the latter has passed over the vocal organs. The speechless patient cannot speak externally, neither can he speak internally. He cannot propositionise. This is shown by the fact that he cannot write—cannot express himself in writing, although he may be able to copy. The proposition, it is claimed, is antecedent to internal and external speech. The mind, it is said, must be aroused in propositional form, and then the words must be fitted to the proposition. "Imperception" and the condition of "images" are also referred to. Jackson divided cases of speech defect of central origin into two groups, those in which images were intact and those in which they were defective. To the latter he applied the term "imperception," a term identical with, but long antecedent to, "agnosia." As to the mind of the aphasic patient, it is pointed out that the loss of the powers already alluded to—the power of propositionising, the ability to read and to write—must necessarily make a man "lame in thinking." If imperception be added to the defect of speech, general intelligence will suffer greatly, for the mind will be struck not only on its emissory but on its receptive side. With regard to localisation of speech functions, Jackson's own words are appropriately quoted:

> Whilst I believe that the hinderpart of the third frontal convolution is the part most often damaged, I do not

[1] Brain, vol. xxxviii., Parts I. and II., edited by Henry Head, M.D., F.R.S.

localise speech in any such small part of the brain. To locate the damage which destroys speech and to localise speech are two different things. The damage is, in my experience, always in the region of the corpus striatum.

We have dealt here merely with Dr. Head's exceedingly able and interesting summary of Jackson's views, and we congratulate him on the completeness of his presentment. We offer no apology for the free use we have made of his text in endeavouring to present briefly to our readers the main plan of the work. With reference to the second part of the volume the articles are carefully chosen, and as Dr. Head's paper is a synopsis of Jackson's views, so the reprints of papers presented in the second part will be found to supplement and reinforce those views. And to students who wish to prosecute the subject still further and to study at first hand the writings of one of the great geniuses of medicine, the complete bibliography of Hughlings Jackson's works on speech, which the third part of the volume supplies, will be of the greatest help.

THE GENERAL PRACTITIONER AS SPECIALIST.

ONE of the problems that constantly confront a medical man is how best to effect a compromise between what he knows to be the best procedure and the procedure which is the best possible in the circumstances. Every practitioner can recall in a moment cases where considerations of time, of distance, or of expense have perforce overridden the claims of an ideal procedure. In the work of a general practitioner the particular aspect of this problem often presents itself as a choice between the course which an expert would choose and the course which, though a second best, is that with which the practitioner is most familiar. He has to decide, in fact, whether it is better to do the best thing poorly or the next best well. To crystallise our hypothesis, we may suppose that it is a question of giving an anæsthetic. Now it may well happen that the practitioner realises that in the particular case in question a deep degree of narcosis maintained by ether offers the best possible solution of the clinical problem before him. Yet he has not given ether since he was a student, but is fairly familiar, through confinements and other occasions, with the administration of chloroform. Which had he better do? Bungle with an ether apparatus or get fair success with chloroform? Then, again, he realises that for the occasional anæsthetist chloroform is much more safely given from a Vernon Harcourt or a Junker's inhaler, both of which limit the chances of overdose, yet his own experience is confined to the use of a drop bottle and a Skinner's mask. Shall he stick to these that he knows or count on the meed of safety which apparatus provides even in inexperienced hands? The right answer to these questions must vary in different cases, for the personal equation is all-important in these matters, and the presence or lack of self-confidence may well turn the scale. But generally speaking it is the prudent course for a man who only occasionally carries out certain duties to carry these out always by one method, and to stick to this one method in which he is, at any rate, partially expert. If in such a case as we have supposed the method involves the use of chloroform, we believe the practitioner is making for safety if he habitually uses a regulating machine of one kind or another. Of the two in common use the Vernon Harcourt is more exact, but the Junker is easier to employ and about half as expensive. The drop method is, of course, easier to employ than either of these machines; it is also, however, much easier to give too much chloroform in this simple way and more difficult to keep up an even degree of narcosis with the smallest possible expenditure of chloroform.

UNILATERAL ROTARY DISPLACEMENT OF THE CERVICAL SPINE.

IT is not generally recognised that dislocations of the cervical spine without injury of the cord occur. In the *Interstate Medical Journal* for October Dr. H. J. Fitzsimmons has reported four cases of one type which he terms "unilateral rotary displacement of the cervical spine." As he has observed them in one year, this condition appears to be far from uncommon. The following is an example. A girl, aged 8 years, jumped a distance of 5 feet into a sand pile, landing on her head. She did not lose consciousness, but suffered from pain in the back of the neck. After the injury she had a severe infection of the throat to which a "twist in the neck," which was noticed, was attributed. Four months after the injury she came under Dr. Fitzsimmons's observation. She stood with the right shoulder slightly lower than the left, and the head turned to the right. There was no contracture of the sterno-mastoid to account for this. Passive motion was fairly free in all directions but was slightly limited towards the right. The chin could be maintained parallel to the floor in rotation to the right; marked tilting upwards occurred in rotation to the left. The left transverse process of the axis was higher and more prominent than normal. A radiogram showed a rotary displacement towards the right between the axis and atlas. In another case a girl, aged 11 years, while playing in bed fell out, striking her head. She was dazed and had marked pain in the back of the head and complained that she could not turn her head, which was held stiffly toward the right shoulder. Her parents noticed a prominence in the left side of the neck below and posterior to the ear. On examination next day she complained of pain in the right side of the neck. She kept her head tilted towards the right shoulder with her face pointed in the same direction. There was distinct prominence in the left posterior triangle. The neck was held stiffly, but limited rotation was possible to a certain extent towards the right and to a less extent towards the left. The head could be bent to the right shoulder but not to the left. Palpation below the left mastoid process towards the middle line showed marked tenderness. A radiogram revealed slight displacement of the right inferior articular facet of the atlas backward on the corresponding facet of the axis. She was put to bed with her head between sandbags and given one-eighth of a grain of morphine sulphate. She slept soundly, and in the morning all pain had gone and she could rotate her head without inconvenience. She was examined some weeks later and the neck was found quite normal. All the cases showed the following symptom-complex from which this type of "twisted neck" could be diagnosed: 1. Inability to rotate the head without tilting the chin on the side affected. 2. Prominence of the transverse process of the axis on the affected side. 3. Occipital pain. 4. Absence of muscle contraction

to explain the deformity and restriction of rotation. 5. Radiographic confirmation of cervical displacement. Some years ago an American surgeon, G. L. Walton, found that traction was useless for reduction of cervical displacements and advocated manipulation in which, by extending the head diagonally in the direction between the backward line and the lateral line on the side of the convexity, the lateral process and the lamina furnish a fulcrum by means of which the misplaced articular process is lifted. A slight rotary movement completes the reduction. In the present series of cases this method proved successful, but in two reduction took place spontaneously. Dr. Fitzsimmons concluded that rotary cervical displacement is much more common than is supposed, and is sometimes confounded with torticollis. From this it may be distinguished by observing that the muscles on the side towards which the twist exists are relaxed.

THE PURIFICATION OF VACCINE LYMPH.

ONE of the most valid arguments on which antivaccinationists rely for the propagation of their campaign against compulsory vaccination is that of impurity, in a bacteriological sense, of the lymph used. This impurity constitutes the most common cause of possible complications, some of them fantastic, which accompany or follow the practice of vaccination. It must be admitted that this, especially in the past, has been a definite objection put forward by antivaccinationists, because it is based on the occurrence of certain facts such as, for example, post-vaccinal eruptions or anæmia, notwithstanding that such occurrences are open to argument as to whether they are the direct result of the vaccine lymph or due to quite extraneous causes. Those responsible for the supply of lymph have, therefore, been aware of the importance of this question, and been occupied in the search of methods leading to the production of a lymph which should be at the same time both perfectly pure and active, with the object of eliminating any possible complication or any harmful action, however slight, on the human organism. The universal practice at the present time for the purification and preservation of vaccine lymph is based on the action of glycerine, to which attention was first called in 1894 by Professor O. Leoni, of Rome. The addition of a 20 per cent. watery solution of glycerine in the proportion of 3 or 4 to 1 of lymph had been made use of since 1870, but merely with the object of preserving the lymph. Leoni, however, showed that while pure lymph contained numerous micro-organisms, the glycerinated form after one to four months not only remained specifically active but presented a marked diminution of these extraneous germs. Moreover, S. M. Copeman, in this country, who made extensive investigations on the bacteriology of vaccine lymph, advocated the storage of glycerinated lymph in a low temperature and in the dark. It is easy to understand that this method, though constituting a striking advance in the practical means of preserving and purifying the vaccine lymph, is still far from the ideal from the point of view of the absolute sterilisation of extraneous micro-organisms. Blaxall's method of adding essence of cloves to the lymph has been recently improved upon by De Blasi, who introduced a modification by which the essence of clove, the glycerine, and the lymph are mixed in the proportion of 1, 3, 1. By this means the quantity of water added to the lymph is reduced to half that required in Blaxall's original method. This is of practical importance, since the vaccine is less fluid and its activity is preserved for many months. Those interested in the subject will find a communication in *Il Policlinico*, Oct. 24th (Practical Section), by Professor L. M. Spolverini, of Rome, describing the effect of the use of vaccine lymph thus prepared on 300 children in comparison with that in which ordinary glycerinated lymph was used. All the various samples of lymph used, even when more than 6–7 months old, were found to be active. Samples of ordinary lymph caused marked local reaction, nearly always a rise of temperature, occasionally as much as 38° to 38·5° C., and evident glandular swelling. On the other hand, clove-treated vaccine caused a less intense local reaction, hardly ever any glandular reaction, and only slight rise of temperature. No complications were noticed with either kind of lymph, either immediate or subsequent.

VENOUS BLOOD PRESSURES IN CARDIAC DISEASE.

IN view of the fact that clinical estimations of arterial blood pressure have been so generally studied and found to be useful, it is somewhat surprising that comparatively little attention has been given to the consideration of venous pressures in health and disease. This question has been carefully studied by Dr. Admont H. Clark, of Baltimore, who has published his conclusions in an interesting paper in the *Archives of Internal Medicine* of Oct. 15th. The apparatus employed in these observations was that devised by Hooker.[1] It consists of a small glass cup of hemispherical shape, 2 cm. in diameter and 1 cm. in depth, which is sealed to the skin over a suitable vein on the back of the hand by a rim of collodion. This is connected to a water manometer by a rubber tube, and the air pressure in the cup can be increased by compressing a bulb connected with the manometer. It is recommended that the vein be observed by oblique illumination, the point where slight oscillations of pressure cause the vein shadow to come and go promptly just before the vessel is completely collapsed being the most satisfactory one to read off the manometer pressure at. The so-called "heart level" was adopted for the position of the hand when the observations were made—that is, "the midpoint of the antero-posterior diameter of the body at the costal angle." The necessary conditions for observations are that the vein must stand out sufficiently from the skin level to give a distinct shadow on oblique illumination, the vein wall must be collapsible, and the patient must be lying quietly in bed. Observation of eight cases to discover what is the diurnal variation of venous pressures both in cardiac and other cases showed that it might be as much as 8, or even 12 cm. of water. In answer to the question as to what should be regarded as a pathological venous pressure, Dr. Clark takes 20 cm. of water as the upper limit of the normal, in this agreeing with Dr. Hooker. He divided his cardiac cases into "compensating" and "decompensating" groups, and found that in the former the average venous pressure readings never went above 20 cm. of water, while in the latter the average never went below 20 cm. Dr. Clark suggests that a pressure above 20 cm. gives a

[1] Hooker: American Journal of Physiology, xxxv., p. 73, 1914.

serious aspect to a case, a pressure below this a favourable outlook. In cardiac cases it was found that the highest venous pressures occurred during the sleeping hours, while in normal cases the lowest pressures of the diurnal variation occurred at night. Death from cardiac decompensation is preceded by a continuously high venous pressure or by a rapid rise. Venous pressures and the output of urine showed an inverse relation as a general rule. The venous pressures were lowered in seven out of eight pleural tappings for hydrothorax. Venesection was performed in three cases, with the result of a considerable fall in venous pressures, but the subsequent rise was rapid in all of them. Dr. Clark lays stress upon the pressure of 20 cm. as marking the danger line between compensation and decompensation, and is of opinion that venous pressure observations at short intervals give information as to the degree of cardiac decompensation which is not obtainable from records of the arterial pressures and that it affords valuable prognostic and therapeutic indications.

THE SHORTAGE OF DENTAL PRACTITIONERS.

IN the account of the proceedings of the General Medical Council published in our issue of Nov. 20th we find a reference to the question of the number of men entering the dental profession. There is some doubt in the opinion of certain of the licensing bodies whether there is an actual shortage of qualified dental practitioners, inasmuch as there are many such who are not fully employed owing to the public not being fully convinced that they possess educational advantages over the unqualified men. To our mind the question is largely one of demand and supply, the supply at the present time being equal to the demand. The public may be roughly divided into two groups: those paying attention to their teeth and seeking the aid of conservative dentistry, and those neglecting their teeth and eventually being driven to have wholesale extraction followed by the adaptation of dentures. The first group, the more intelligent, seeks advice mainly from those who are properly trained; the second group in many cases seeks the service of the unqualified, whose main object is the manufacture of artificial dentures. At the present time the first group is in the minority, but with the spread of knowledge of the importance of the teeth the first group will tend to increase until in turn it will largely outnumber the second group. With this increase in the number of the first group will come an increased demand for properly trained dental aid, and the individual himself will take the pains to inquire more and more into the capabilities of the practitioner to whom he will entrust himself. A sign of growth of the first group is the swelling number of children being brought to the dentist at an early age by parents of the well-to-do class, as well as by the rapid increase of school dentists owing to the work of the education authorities. In other words, the child of the present day is acquiring the habit of cleansing and caring for the teeth and this will result when he reaches adult life in leading him to place value on their preservation. There is already a rapidly increasing demand for the services of those trained in conservative dentistry, and a decreasing demand for those who are simply adapters of artificial teeth. A training in dental mechanics does give in many cases a sufficient knowledge to adapt dentures, but the skill to perform conservative operations can only be acquired after a thorough training in a dental school and hospital. It seems, therefore, to us that the future will see a big demand for the properly qualified man, and with the demand will come the supply. We think the educational authorities should seriously consider the manner in which the future dentist should be trained. It is clear that the work required of him will be more of the character of dental surgery than dental mechanics, and he will need to possess a wider knowledge of the relation of dental disease to other pathological processes. The curriculum should be altered with the object of enabling him to acquire this knowledge and to become better equipped for the work he will be called upon to do.

WE are glad to hear that the King's convalescence has reached the stage at which he has been able to go out in a bath-chair in the gardens of Buckingham Palace and to visit Queen Alexandra at Marlborough House.

THE Bradshaw lecture at the Royal College of Surgeons of England will be delivered by Sir Anthony Bowlby on Monday, Dec. 20th, at 5 o'clock P.M., the subject of the lecture being "Wounds in War."

THE Croonian lecture of the Royal Society for 1915 will be delivered on Thursday next, Dec. 9th, at 4.30 P.M., by Dr. W. M. Fletcher, F.R.S., and Prof. F. G. Hopkins, F.R.S., on the Respiratory Process in Muscle, and the Nature of Muscular Motion.

THE Gold Leeuwenhoek Medal of the Royal Academy of Sciences of Amsterdam, given for the most valuable microscopic work of the past decade, has been awarded to Sir David Bruce for his researches into Mediterranean fever, tsetse-fly disease, and sleeping sickness.

WE deeply regret to announce the death, on Monday last, of Dr. Kenneth W. Millican, who was recently appointed Assistant Editor of this journal. Dr. Millican had been seriously ill for the past three months.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

THE WEEK'S SUBSCRIPTIONS.

THE subscriptions to the Belgian Doctors' and Pharmacists' Relief Fund received during the week have been as follows:—

	£	s.	d.
B.M.A. New South Wales Branch (£139), Queensland Branch (£74), Tasmania Branch (£47) (per Dr. W. H. Crago, Hon. Treas.) ...	260	0	0
Mr. Chas. J. Hill Aitken	1	1	0
Dr. Greenwood (per Dr. Barrs)	2	2	0
Mr. J. W. Thompson ...	0	16	0
B.M.A., South Carnarvon and Merioneth Division (per Dr. E. Lewys-Lloyd)—			
Dr. Rowlands	0	10	6
Dr. Lloyd Owen	0	10	6
Dr. Thomas	0	10	6
Dr. Pierce Jones	0	10	6
Dr. Vaughan Roberts	0	10	6
Dr. Green	0	10	6
Dr. J. R. Jones	0	10	6
Dr. Richard Jones ...	0	10	6
Dr. Harry Griffith ...	0	10	6
Dr. E. Lewys-Lloyd ...	0	10	6
Dr. Jones Evans ...	0	10	6
Dr. R. T. Jones	0	10	6
Dr. J. O. Williams ...	0	10	6
Dr. J. Myles	0	10	6
Dr. Hugh Jones	0	10	6
Dr. Evan Williams ...	0	10	6

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Vœux, at 14, Buckingham-gate, London, S.W., and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Ltd.

THE QUESTION OF FATIGUE FROM THE ECONOMIC STANDPOINT.[1]

SECTION I.—*The Nature and Causes of Fatigue.*

FATIGUE in general may be defined as a "diminution of the capacity for work which follows excess of work or lack of rest, and which is recognised on the subjective side by a characteristic malaise." This subjective sensation of malaise is found[2] as a local sensation of fatigue, particularly in the muscles; as a general feeling of tiredness; and as the experience of sleepiness. But such sensations are no more than symptoms of the diminution of working capacity and not always even that. As Dr. Rivers has stated: "A distinction must be made between the sense of fatigue and the lowered capacity for work. These conditions, which may be spoken of as subjective and objective fatigue respectively, do not always run parallel courses. In the performance of mental work especially, decided sensations of fatigue may be experienced when the objective record shows that increasing amounts of work are being done; and there may be complete absence of any sensations of fatigue when the objective record shows that the work is falling off in quantity or quality, or in both." This insistence on the distinction between subjective and objective fatigue, however, does not imply that the one has no influence on the other. As Weber points out[3]: "This psychically conditioned fatigue is by no means without its influence on working capacity ..... and in the long run it can undoubtedly cause an unfavourable general disposition which will ultimately find a physical expression."

The physiological *modus operandi* of fatigue must be considered separately from external causes. It has been found that muscular fatigue is caused by the accumulation of the poisonous products of activity and the exhaustion or diminished supply of the substances necessary for the continuance of activity. The application of these physiological definitions is, however, wholly impracticable in the present state of our knowledge, even in regard to the fatigue of isolated muscle, and still more so in the case of general bodily or mental fatigue.

In studying fatigue from the economic standpoint it is, of course, the objective diminution of working capacity and the external causes found in industry that will be the prime consideration. Subjective fatigue will be of importance just so far as it influences objective fatigue. Physiological or "internal" phenomena will gain importance as intermediate stages between external economic causes and external economic effects. Viewing the subject, then, objectively and externally, work and rest may be regarded as two forces affecting the organism oppositely, and alternately producing fatigue and recovery. In general, we shall regard simple fatigue as the result of the work that immediately preceded it and dating since the last rest, daily, weekly, or yearly. The "duration of work" previous to any given point of time is the function that will in our conclusion be correlated to the degree of fatigue at that given time.

As a preliminary, we must observe that there are many other factors influencing the degree to which fatigue may occur in any particular case. A strong individual, on easy work and in pleasant surroundings, may after five hours' work be much less fatigued than is a weakling after three hours on hard work and in noxious surroundings. From the economic standpoint, and with the definition of fatigue we have adopted, however, these other factors will appear as predisposing conditions, enabling excess of work or lack of rest to take effect to different degrees, rather than as active determining causes. Though the conditions will be noted in every case, variations in fatigue will be primarily correlated, not with variations in them, but with the different amounts of work or rest that preceded the fatigue. These further factors or enabling conditions may be grouped under the following heads:—

1. The Nature of the Work. See Section I.A.

2. The Surroundings or Environment of the Work. (*a*) Conditions of Factory Hygiene. See Section I.B. Temperature and humidity (ventilation); light (suitability and cheerfulness); room; noise (amount and regularity); smell. (*b*) Factory Organisation. A. The Incentive to Speed or Quality. 1. Type of payment: by a profit (a "surplus"); by a fixed wage-rate or bonus; time basis; piece basis. 2. Honour, sporting instincts, &c. 3. Interest in the work itself. B. Grouping and Subdivision of Labour. (*c*) Economic organisation. Cycles of prosperity; relationship to work (cash nexus, hobby, &c.).

3. The Nature of the Worker. Age; sex; skill and training; opinions (Weber).

4. The Habits of the Worker. (1) Sleep, length and times; (2) nutrition, nature and times, drinking of alcohol; (3) clothing (e.g., its tightness—Roth Index C1); (4) sexual relations (Weber); (5) recreation—especially Sundays; (6) by-occupations; (7) getting to and from home.

The chain of causation can, of course, be followed further back—e.g., light and temperature are determined by the time of day or night. But such meteorological or social variations form the background and need not be more than suggested.

SECTION I.A.—*The Nature of the Work.*

The factor of nature of work would, in any case, require detailed study where fatigue is being viewed from the economic standpoint; but such a study is particularly necessary owing to the confusion of thought and the inconvenience of the terms commonly used. We shall have to keep separated in our minds three distinct sets of notions: the state and feelings of the worker; certain definite characteristics of the work that alone or together evoke such affections; and the sort of occupations in which such characteristics are usually found.

Now the work of most people can be analysed more or less into a series of separate but *similar* operations, each resulting in some "output" or service; and each separate operation may, in turn, be more or less analysed into the different actions that it involves. With this conception in mind, we shall be able to estimate more exactly the important "evocative" characteristics of different sorts of occupations, by putting to each the following questions: (*a*) What does the operation consist in? What are the separate actions involved? (*b*) How do the actions fit together into the whole operation, i.e., how complex is the operation? (*c*) How far are the acts similar in each recurrence of the whole

[1] Interim Report of a Committee of the British Association for the Advancement of Science, consisting of Professor J. H. Muirhead (chairman), Miss B. L. Hutchins (secretary), Mr. P. Sargant Florence (organising secretary), Miss A. M. Anderson, Professor Bainbridge, Mr. E. Cadbury, Professor Chapman, Professor Stanley Kent, Dr. Maitland, Miss M. C. Matheson, Mrs. Meredith, Dr. C. S. Myers, Mr. C. K. Ogden, Mr. J. W. Ramsbottom, and Dr. J. Jenkins Robb.

[2] Report of the British Association, Dr. McDougall, 1908.

[3] Zur Psychophysik der industriellen Arbeit in Archiv für Sozialwissenschaft und Sozialpolitik, by Max Weber.

operation, i.e., how uniform is the occupation? (*d*) How frequently does each operation recur? (The frequency is measurable by the average output per hour or per day.) (*e*) How periodic or regular is the frequency of recurrence of each operation? (The regularity is measurable by the mean deviation from the average output per hour or day.)

According to the characteristics elicited by the above questionnaire may be classified the different occupations, or crafts, involved in industry, and some estimate formed of what affections are evoked in the workman by each of such classes of crafts.

(*a*) *Nature of work.*—The actions (movements and postures, mental states, &c.) involved in different processes affect the psycho-physique either muscularly or nervously. "Finicky" work, like tying or wrapping up packets or assembling small parts, tires the muscles of the hand; packing bulky goods into cases, or lifting and carrying heavy weights, and standing up to work generally tire the central muscles, and illustrations of such muscular overstrain were given by Miss Anderson, the principal Lady Inspector of Factories, before the Departmental Committee on Physical Deterioration, 1904, where enormously heavy weights were carried. These examples of muscular work become a strain, generally, because the tax they impose on the body is concentrated or "focussed" on one particular part: a part whose structure was evolved only to meet the calls of every-day life. This characteristic of concentrativeness is also obviously involved in all activities calling upon the central nervous system.

Now, such activities of the central nervous system as attending, controlling the muscles, making judgments, remembering and perceiving (sensing and reacting), are activities often exercised in modern industry. Soldering, mending, and most skilled trades, for instance, exercise a judgment of quality in the sense of a comparison with a standard kept in memory. Pasting on labels or cutting articles accurately to shape involves not merely sensitivity of the eyes, but the judgment of distance and a control over muscles; and inserting articles in revolving slots, like the paper in a rotary litho machine, involves a judgment of time.

Certain portions of a whole operation often do not consist in action so much as in passive rests, waiting for the material to set, perhaps. This non-persistence is a characteristic here conditioned by the very nature of the work. Figures were collected in the United States Report of the Conditions of Employment in the Iron and Steel Industry to show the percentage of active work to idle, the actual time being measured by stop-watch to the one-tenth of a minute, for an average of four or five days. It is explained that "active" means essentially "that the employee was engaged during the time shown in actually performing some particular function and not simply waiting for the completion of some process or for his fellow-worker to finish some particular job. Such time as this, if it lasted more than a minute or two, would be included under the head of idle." In a later part of this report there is a discussion concerning the daily distribution of accidents in the iron and steel trades and of the output of Bessemer converters. In both these processes, tables have been worked out showing that the "active" time varies materially with the precise nature of the work—e.g., a "stripper craneman" is "active" 37 per cent. of his time, while a "steel pourer" in the Bessemer is "active" 82 per cent., and these variations must to a large extent have conditioned the two daily distributions. These are American conditions differing very much from English. Americans generally work a longer day, but use more machinery.

(*b*) *Complexity.*—On the results of combining several movements in one operation much light is thrown by the articles of Max Weber. Complex operations, like the stamping of tin sheets into boxes, or the filling of such boxes by a machine whose movements are regulated at the will of the operative, are of extreme frequency in women's industries to-day and involve in all cases: (1) the feeding of the machine or generally the placing of the materials in position; (2) the moving of a handle or pedal; (3) the taking out of the finished article, all of which movements—often engaging different limbs—have to be timed in succession. It should also be noted that a large proportion of the work in connexion with iron and steel making involves complexity of action. Weber quotes Vogt as holding that "operations which are particularly closely related, as regards the psycho-physical parts that they employ, disturb one another in a particularly high degree."

(*c*) *Uniformity.*—In the industrial world to-day there is the widest variation in the uniformity of any one worker's occupation—i.e., in the similarity of the different actions in each recurrence of the whole operation. Machine-tending, for instance, involves constant nervous attention, perhaps, but the muscular action varies continually according to what it is that goes wrong with the machine.

(*d*) *Frequency.*—In studying here the frequency of the recurrence of any unit operation we must concentrate on the frequency due to the simplicity of the work or to the (most economical) speed of the machine. It has been one of the results, if not the aim, of the industrial division of labour to simplify or specialise the task of every individual so that he may become an adept by its frequent repetition. There are still processes, however, that have remained of small frequency, e.g., certain processes in the iron and steel trades.

(*e*) *Regularity.*—The interval of recurrence of the whole operation is very irregular in the piecing up of the spinner and all machine-tending, but it is particularly irregular in dealing with people, as the tram-conductor, policeman, and telephone operator have to do. Recurrence is fairly regular in iron and steel smelting and very regular in all machine-feeding operations, such as stamping and pressing, where the machine is continually running independent of the operator's will.

Table showing the Affections Evoked by Different Kinds of Work.

Material	Material condition.	Relevant qualities often produced.	Workers' affections that result.
A. Natural	... ...	ur	—
B. Machine-made	... ...	UR	Lack of Interest.
C. Human	... ...	ur	Worry (Interest).
Machine:			
Machine acting at will of worker	...	UFC	Worry. Monotony (Boredom).
Machine continually running:			
(*a*) Insertion of material or "feeding" by the worker	... ...	FR	"Drivenness."
(*b*) Attendance by worker only	...	fru ..... Fru	Interest. Attentive Care.
Industrial Organisation:			
Great Specialisation	... ...	UF	Monotony.
Efficient "Routing"	... ...	R	"Drivenness."

The whole question of the affections evoked by different kinds of work, apart from the particular actions involved, may be summed up in tabular form in three columns, the first showing the

relevant conditions of material, machinery, and organisation, the second the evocative characteristics of the work produced by such conditions—namely, great or little complexity (C & c), great or little uniformity (U & u), great or little frequency (F & f), great or little regularity (R & r), and the third, the affections (states or feelings) of the worker evoked by these characteristics, that may be supposed to lead ultimately to general fatigue.

These unpleasant and ultimately fatiguing affections vary for different people, and some can be overcome by certain adaptations. Thus, the sense of being driven can be overcome if the worker can fall into the rhythm of the machine. Nearly all individuals can to a certain extent automatise uniform and frequently recurring action, and by thus enabling themselves to keep their minds off their work can prevent monotonous feelings. This, at any rate, is the case with such proficient knitters as the Hausfrau, who can work and read simultaneously, and girls in the factory who can work and talk.

SECTION I.B.—*Ventilation, Humidity and Temperature, and other "Conditions of Factory Hygiene."*

The latest research has resolved different degrees of ventilation as simply different degrees of heat and moisture combined. To quote Professor Lee[4]:

"Much experimentation has shown that the evil results of confinement in improperly ventilated rooms are caused not by the presence of toxic products of respiration, but by the heat and the humidity combined. When the air of the chamber was put into motion the temperature of the skin fell, the unpleasant symptoms disappeared very quickly, and the subject felt as if fresh air had been supplied. When the subject had been confined for a considerable time and the symptoms had become well developed, the breathing of pure air through a tube passing from the subject's face through the wall of the chamber to the outside brought no relief."

We may, therefore, concentrate our attention on the effect of temperature and humidity.

Authorities are quoted, in regard to very various classes of workers, to show that a warm and moist atmosphere naturally causes lessened activity of nervous and muscular structures; and that activity, enforced in spite of the desire for rest, causes an amount of fatigue disproportionate to the amount of work performed. Exertion begins to be accompanied by depression with a wet bulb temperature of 77° F., and a temperature of 86° F. (dry bulb), together with a saturated atmosphere, causes enervation and exhaustion.

As regards different temperatures separately from humidity, a chance of noting their result on working capacity is given by changes of season and weather. In *Harper's Monthly* for January, 1915, under the heading "Work and Weather," Professor Huntingdon traces the variations in manual and mental work as the year proceeds. Combining various workers' piece-earnings, for the same weeks, in the four years 1911–14, in two Connecticut factories, he found that the "lowest wages are earned during January, then there is a rather steady increase through February, March, April, May, and the first half of June. A little after the middle of June the amount of work begins to fall off and continues to do so for the next two or three weeks. Then, through July and August, the curve remains at a lower level than in June, but much higher than during the winter, a somewhat surprising fact. About the end of August people once more begin to work fast, and they go on at an increasing rate until the middle of November. Then the rate begins to fall, but recovers somewhat in December, and finally at the end of that month drops off very rapidly." Testing the course of mental work by the marks awarded students at West Point and Annapolis U.S. Military and Naval Academies, approximately the same results were found. Professor Huntingdon finds that in general the summers of southern New England are less debilitating than the winters. It requires extreme summers, such as are experienced only once or twice in a century, to produce effects as harmful as those of an ordinary winter.

It has been found in Germany that the industrial accident-rate (calculated in proportion to the ascertained numbers at work) is less by night than by day. These findings are not supported, however, by the experience of a large American iron- and steel-making plant published and exhibited at the San Francisco Exhibition, 1915, by the United States Department of Labour. In each department the accident-rate was higher by night than by day. It is important to bear in mind, however, as will be pointed out in Section IV., that bad lighting may have a direct effect in causing accidents without affecting working capacity; so that the conflict in the conclusions of students may well be attributable to differences in the standard of lighting in the factories where they investigated.

As regards the output of night and day compared, the Curtis Publishing Company, of Philadelphia, very kindly presented records of the hours spent by a single worker on pressing 10.000 "good impressions" of the *Saturday Evening Post*. The average hours thus spent by 53 day men was 5·04 per man; by 46 night men 4·78 per man. According to this, therefore, working capacity would seem slightly higher at night than during the day.

(To be concluded.)

[4] Journal of Industrial and Engineering Chemistry, vol. vi., 1914, p 245.

A MILK SIMILAR.

THERE has recently been placed upon the market a fluid food which may be said to bear the same relation to cow's milk that margarine does to butter. Chemically it is indistinguishable from cow's milk, and physically it shows very close relations. It is, at all events, a perfect emulsion, containing fat, proteins, sugars, and mineral salts. Cow's milk is similarly a perfect emulsion, containing the same proximate dietetic principles. This artifical milk, or "Solac" as it has been called, further shows such a close resemblance to cow's milk that cheese has been made from it, and yet it is entirely free from products of animal origin. Its proteins, fats, sugars, and mineral salts are drawn exclusively from vegetable sources. In THE LANCET of Oct. 19th, 1912, we announced the production of what was then called "synthetic milk," and an opportunity occurred to our consulting chemist of examining this product. The substance, he reported, "looks very like milk and has a round sweet fatty flavour not unlike that of rich milk."

"Solac" is this "synthetic milk," which, since it was first produced, has had the benefit of modifications due to experience, and we have now the production on a large scale of a fluid less distinguishable from cow's milk than ever before. The process is being carried out at the Solac Company's premises, 221, Tottenham Court-road, London, W., and our consulting chemist, who has witnessed it, reports that everything is carried out with

scientific cleanliness. It must be borne in mind, however, that though we may obtain this close similarity from the chemical and physical standpoints, the ultimate test must be a physiological one. There are physiological qualities of cow's milk which cannot be referred to proteins, fat, sugar, and salts, and it is well known that the presence of enzymes or ferments or of vitamines is of first dietetic importance, the main difference between raw milk and boiled milk having been traced to the destruction of these bodies in the latter by heat. But by introducing a lactic culture of a selective strain at a certain stage of its production the necessary biological activity is given to this artificial milk. We have examined a good many samples of this "vegetable milk" and have found that the non-fatty solids range from 8·96 per cent. (consisting of proteins, dextrin, and sugars) to 9·5 per cent., while the fat ranges from 3·69 to 3·9 per cent. The proteins consist chiefly of globulin, known as glycinin, which is a very rapidly digestible "vegetable casein"; the fats are of vegetable origin, showing the same melting point and ease of hydrolysis as ordinary milk-fat; while the sugars and dextrins present are both again known to be of ready assimilability. The above figures are identical with those given by pure rich cow's milk.

The working basis of "solac" or vegetable milk is the soya bean, which is particularly rich in oil and protein, the latter of an easily digestible type. The beans are very rigorously cleansed prior to the beginning of the extraction and emulsifying processes. A residue of bean cake is left which possesses high nutritive properties, and this has already been used for making a bread, where its nourishing properties appear to be enhanced. The cake contains from 10 to 11 per cent. of oil and 20 to 24 per cent. of protein.

This novel invention is of some importance, especially at the present juncture, when the methods of practising food economies are uppermost in all minds. If it is proved that this vegetable milk can in the majority of purposes effectively replace cow's milk, the "similar" will naturally claim considerable attention for many reasons. To begin with, such a milk at once disarms all suspicion as to contamination with dirt and disease organisms. It is made under conditions which clearly have nothing in common with milking the cow and the risks of infection which that process entails. It is cheap and can be produced at will so long as the supplies of raw materials do not fail, which is highly improbable. The supply, therefore, whatever the demand, can always be maintained. There is no reason why it should not possess the same nutritive properties of cow's milk itself, having regard to the scientific method of production. Further, there is the suggestion that in the dried form this vegetable milk may be preserved for all time, and be available to produce again, by mere mixing with water, a fluid which to all intents and purposes fulfils most of the requirements of cow's milk. The adoption of margarine as a substitute for butter has been definitely justified by physiological experiment and the evidence of practical experience. With possibly a few limitations the use of an imitation milk such as "solac," the preparation of which is controlled by scientific authorities, may conceivably receive a similar endorsement, and a new and important economic source of food-supply be made available for the public need. It has already been used with success by the baking and confectionery trades.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

The Sanatorium Benefit in Ireland.

IN many parts of Ireland the Insurance Committees have not as yet succeeded in arriving at an agreement with the local authorities as to the working of tuberculosis schemes. In their endeavour to come together they have hitherto been hampered rather than helped by the two Government Departments concerned—the National Health Insurance Commission and the Local Government Board. Each of these bodies issued model schemes, and these model schemes presented points of radical difference. The Insurance Commissioners have now issued a second model agreement which goes very much further than either the Local Government Board or the local authorities had asked, and gives away more than any Insurance Committee is likely to concede. In all previous schemes an essential point was that, in virtue of receiving the sums at the disposal of the Insurance Committee of its area, the county council should take the responsibility of treating all insured persons entitled to the benefit. The difference between the expenditure on such purpose and the sum received from the Insurance Committee, if any, would be met in equal parts by the county council from the rates and by the Treasury. The new scheme limits the financial responsibility of the county council to the sum received from the Insurance Committee. It is not clear that an Insurance Committee would reap any benefit from entering into such an agreement. Again, the new scheme prohibits an Insurance Committee from recommending an insured person for benefit, except on the advice of the tuberculosis officer, who is the servant not of the committee but of the county council. In the past Insurance Committees have been urged by the Commissioners to obtain representation on the committees of management of the county councils; this point is now withdrawn. Again, from the point of view of treatment, the scheme is open to serious objection. In England, 6*d.* of the 1*s.* 3*d.* per head available for the benefit is earmarked for domiciliary treatment. This scheme proposes to earmark 8*d.* for sanatorium and hospital treatment: the first charge on the other 6*d.* (1*d.* being kept for administration purposes) is to pay one-fifth of the salary and travelling expenses of the tuberculosis officer, and what remains is then available for other treatment. In country districts there would probably be nothing left for domiciliary treatment. In this suggested scheme, as on several previous occasions, the Insurance Commissioners have ignored the recommendations of the Departmental Committee on Tuberculosis.

Local Government Board and Vacant Dispensary Appointments.

Several boards of guardians have had difficulty in filling dispensary appointments within the past few months, as most of the young medical men who would in ordinary course seek such appointments are now serving in the army or navy. The Local Government Board has now written to the Londonderry guardians suggesting to them that the making of permanent appointments during the war appears inequitable, and that, instead of filling up vacancies, the guardians should make the best temporary arrangements that they can. It is only right that

men who have sacrificed some of their best years to the national service should not, on their return, find all avenues of professional work closed against them. The Local Government Board has acted with much public spirit in regard to dispensary medical officers desiring war leave, and its attitude has been of signal help to the War Office.

Belfast Doctors and the War.

The White Star ss. *Britannic* is being rapidly fitted up as a hospital ship at Harland and Wolff's shipyard, Belfast, and will be ready to leave early in December for the eastern theatre of war. She is under the care of Lieutenant-Colonel Anderson, R.A.M.C., and will have beds for 1000; and, when completed, will probably be the finest ship for wounded men afloat. Dr. J. S. Morrow and Dr. J. L. Rentoul, both with the rank of Captain, are going as physicians.

Belfast University and the War.

The Senate of the Queen's University, Belfast, decided on Nov. 26th to ask its teachers and students of military age and fitness (other than medical students in their fourth and fifth years) to enlist, offering the latter the return in full of their university fees. The Senate engaged further not to appoint during the war any person of military age and capacity to any position in the university unless exceptional necessity should arise, and then only temporarily.

Nov. 30th.

ITALY.

(FROM OUR OWN CORRESPONDENT.)

The Opening of the Italian Universities.

THE week now closing has been a memorable one for the "Third Italy." At her 23 seats of learning she has opened the academic year with addresses from members of the professoriate specially chosen *ad hoc*, and each address has struck a clear, resonant note, appealing to the young auditor on the country's claims on his service, in whatever capacity he may be called upon to render it. It is safe to say that the response to that appeal was unanimous in sentiment and in alacrity, the orator finding in each auditor what Pericles called a ξυνειδὼς ἀκροατής (a thoroughly sympathetic hearer), ready to go to the front and to qualify for the "Roll of Honour," in keeping with his country's record in the past, and her highest interests in the future.

In Rome, in the Aula Magna of the "Sapienza," the orator of the day was a medical man, Dr. Giuseppe Sanarelli, recently tranferred from the Chair of Experimental Hygiene at Bologna to that in Rome, a choice more than justified by the address, as brilliant and effective as it was opportune. To its leading points I may return, but meanwhile let me refer to the ceremony which preceded it, the unveiling in the University itself of a memorial in bronze of Bartolommeo Eustachi, better known as Eustachius, the sixteenth-century anatomist, who divides with his great rival Vesalius the post of honour as a pioneer in that *métier*. Born at San Severino in the Marches, he died in 1574 after a life-long tenure of the Chair of Anatomy in the Roman school, during which he impressed relays of pupils, Italian and foreign, as not only an inspiring exponent of the science, but as a devoted exemplar of the experimental or inductive method, and, on these lines, an enricher of its subject-matter. The monument, a *chef d'œuvre* of the sculptor Giuseppe Tonnini, represents the stately figure of Eustachius in academic robes, delivering from his chair a lecture to his students. In his left hand he holds a human cranium, while his right rests on the plates on which is engraved the intimate structure of the ear. On either side are grouped his young listeners in attitude of rapt attention. The ornamentation above consists of surgical instruments artistically disposed, and below the inscription, from the pen of Signor Giri, professor of Latin, runs as follows:—

Bartolomaeo Eustachio
Picenti
Artis Anatomicae Lumini
Senatus Academicus
Quartis Feriis Secularibus
Anno MDCCCCXIV.

The unveiling was preceded by a brief discourse from the Rector Magnificus, Professor Tonelli, in presence of His Excellency the Prime Minister, Signor Salandra; the Minister of Public Instruction, Signor Grippo; the Syndic, Don Prospero Colonna; the Senatus Academicus; and an effective representation of the scientific, artistic, and literary bodies of Rome. Inserted in the wall of the upper *loggia* of the "Sapienza," the monument is placed next the tablet in honour of King Victor Emanuel II., appropriately suggesting the dynastic conditions under which the "Third Italy" resumes her place, not only in the "comity of nations," but in the sphere of nature-study and the sister sciences leading up to the healing art.

Nov. 24th.

ASYLUM REPORTS.

Northumberland County Lunatic Asylum, Morpeth (Annual Report for the Year 1914).—The total number of cases under treatment during the year was 1039, the average daily number resident being 796. The admissions numbered 238, of which 222 were direct. There were discharged 130 patients, with a recovery-rate of 34·8 per cent., calculated on the total admissions. The deaths amounted to 125, 73 men and 52 women, making a death-rate, calculated on the average number resident, of 15·7 for the males and 15·6 for the females. This rate is unusually high. In the table of causes of death 21 are attributed to general paralysis, 15 to epilepsy and other forms of disease of the brain, 32 to phthisis and other tuberculous diseases, 12 to colitis, and 23 to senile decay. Twenty of the persons who died were 70 years of age or upwards. As illustrating the unfavourable character of many cases sent to this asylum for care and treatment, it may be noted that no fewer than 14 died within the first month. The want of adequate space for the sick and infirm has continued to be a source of much anxiety and great inconvenience. In coöperation with the Royal Commission on Venereal Diseases it was arranged that every case admitted during the last quarter of 1914 should be examined by means of the Wassermann reaction. Fifty-five patients were admitted, 53 were examined, and in 20 per cent. of the cases the reaction was positive.

Cumberland and Westmorland Lunatic Asylum (Annual Report for the Year 1914).—The total number of cases under treatment during the year was 1036, the average daily number resident being 862. There were 165 admissions; 151 were direct and 14 transferred from other asylums. Ten of those admitted were private patients. The admissions included 10 cases of congenital imbecility, 8 cases of insanity with epilepsy, 1 case of general paralysis (as compared with 13 the previous year), 23 cases of confirmed dementia, and many others that were hopeless from the time of admission. Cases in which excitement was the main feature were twice as numerous as those characterised chiefly by depression. During recent years the proportion of unfavourable

cases amongst the admissions has shown a marked increase. Of the direct admissions, excluding congenital cases, 36 6 per cent. were brought to the asylum within a fortnight of the onset of their attack, 62·6 per cent. within three months, while in 17 6 per cent. the attack had been allowed to progress for over a year before recourse was had to asylum treatment. There were 111 discharges, with a recovery-rate, calculated on the direct admissions, of 42 4 per cent. The average stay in the outer world of those who were readmitted relapsed last year was over five years, which is a proof that no undue risks are taken in sanctioning the return of patients to home life. Of those who recovered, 40·6 per cent. were brought to the asylum within a fortnight of the onset of their attack, 73·4 per cent. within three months, while in 11 per cent. the attack had been in progress for over a year before admission. Experience as well as statistics show the advantages of early treatment in the asylum in promoting the chances of recovery and in mitigating the severity and duration of the attack. The deaths numbered 61, making a death-rate of only 7 per cent. on the average daily number resident. Post-mortem examination was held in every case. Ten deaths were due to general paralysis, 12 to tuberculosis, and 2 to colitis.

West Sussex County Asylum, Chichester (Annual Report for the Year 1914).—The total number of cases under treatment during the year was 914, the average daily number resident being 795. There were 134 admissions, of which 123 were admitted from West Sussex. The discharges numbered 56, with 35 recoveries, making a recovery-rate calculated on the admissions, excluding transfers, of 28 per cent., 25 per cent. on the male side, and 30 4 per cent. on the female. There were 60 deaths, 30 on each side. The rate calculated on the average number resident was 7·54 per cent., a lower rate than any recorded for the last 16 years. Phthisis accounted for eight deaths, and general paralysis for seven. In consequence of negotiations between the committee, the Board of Control, and the War Office, the Army Medical Department decided on March 13th, 1915, to take over the whole building for the purpose of a hospital for wounded soldiers. Arrangements were at once made for the transfer of all the patients to other asylums, and the removals were carried out without a single accident. The asylum so vacated was taken over by the War Office as from April 1st.

Worcestershire Asylum, Barnsley Hall, Bromsgrove (Annual Report for the Year 1914).—The total number of cases under treatment during the year was 732, the average daily number resident being 629. There were admitted 111 cases, of which 91 were direct admissions; 9 per cent. of these were aged 70 or over, and fully one-half were found to be suffering from incurable forms of mental disease. There were 75 "first attack" cases, and almost 50 per cent. of these had shown symptoms of mental breakdown for six months or longer prior to admission. Dr. Percy Hughes, the medical superintendent, attributes this delay in obtaining treatment mainly to two causes: first, that the public attaches a stigma to any person who suffers from insanity and is treated in an asylum; secondly, that there is an erroneous belief that all patients in public asylums are pauper patients. Dr. Hughes advocates that the county council should be the sole authority in each county to deal with all questions relating to mental diseases and mental deficiency, and that this authority should have power to establish beds and out-patient facilities in connexion with the general hospitals in the larger towns of the county, so that patients suffering from mental disorder in its initial stages might obtain skilled advice and treatment without in any way being stigmatised. Many cases of acute insanity could probably be aborted in the early stages if such facilities were provided. During the year 71 cases were discharged, of which 12 were recovered, making a recovery rate of 13·2 per cent. on the direct admissions. The deaths numbered 46, and in 45 of these a post-mortem examination was made. The percentage of deaths on the average daily number was 7·3. Active pulmonary tuberculosis was found to be present in 12 cases, and in 7 of these symptoms of this disease had been present on admission.

Nottingham City Asylum (Annual Report for the Year 1914).—The total number of cases under treatment during the year was 1106, the average daily number resident being 897. The numbers are still going up, the increase among the females being 33 and among the males 7, and the extent of overcrowding amounting to 25 males and 46 females. The total number of admissions was 222, of which 15 were transfers and the remaining 207 direct. The average admission-rate for the past ten years has been 171, so that the number admitted last year, excluding transfers, exceeded the average by 36. This large increase was probably not due to the war, since the monthly admission-rate during the latter half of the year was about the same as that of the first. Alcohol was found to have been the cause of the mental breakdown in 14·1 per cent. of the men and in 18·4 per cent. of the women; this was considerably above the average for the women and below it for the men. Only once before in the history of the asylum has the percentage from this cause among the women exceeded that among the men. It is, of course, impossible to say whether this fact is due to the great changes in economic and social conditions produced by the war. The discharges numbered 97, with a recovery rate calculated on the direct admissions of 34·17 per cent. There were 85 deaths, making a death-rate of 9·47 per cent. of the average daily number resident. 20 per cent. of the deaths were due to tuberculosis. All the tuberculous cases were treated in the open air, and this method was also adopted in all the recent cases of acute mania. It has been found over and over again that patients who are almost unmanageable indoors have become quiet when placed outdoors, the open air apparently exerting a soothing effect upon them.

THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

THE undermentioned have been entered as Surgeons for temporary service in His Majesty's Fleet:—Dated Nov. 20th: Leslie Stewart Goss. Dated Nov. 24th: Hugh Thomas Shaw McClintock. Dated Nov. 25th: Patrick Lawrence O'Driscoll. Dated Nov. 26th: Woodburn Gemmell.

The undermentioned have been granted commissions as Surgeons for temporary service in His Majesty's Fleet:—Dated Nov. 22nd: Henry Ward Hales. Dated Nov. 23rd: Thomas Sidney Gibson.

ARMY MEDICAL SERVICE.

Colonel W. W. Pike, D.S.O., to be temporary Surgeon-General (dated Nov. 1st).

Archibald Edward Garrod to be temporary Colonel (dated Nov. 15th).

Major John G. Bell to be temporary Lieutenant-Colonel whilst an Assistant Director of Medical Services (dated June 4th).

Surgeon-Captain Alfred C. Lupton, 1st Life Guards, from the Half-pay List, retires on account of ill-health, receiving a gratuity (dated Nov. 22nd).

ROYAL ARMY MEDICAL CORPS.

Temporary Captain Arthur Martin Leake, V.C., to be temporary Major (dated Nov. 27th).

The undermentioned to be temporary Majors:—

Dated August 5th: Surgeon Major A. C. Stamberg, Medical Corps, the Royal Militia of the Island of Jersey.

Dated Oct. 30th: Henry Edward Leigh Canney.

Dated Nov. 25th: Temporary Captain Ernest H. Starling.

The undermentioned to be temporary Captains:—

Dated Oct. 24th: E. E. Shepley, C.A.M.C.

Dated Nov. 2nd: F. Cameron Wilson, C.A.M.C.

Dated Nov. 12th: Major Edward Wrigley Braithwaite, from the Prince of Wales's Own (West Yorkshire Regiment), Territorial Force.

Dated Nov. 13th: Temporary Lieutenant Richard Le G. Worsley.

Dated Nov. 15th: Temporary Lieutenant Philip N. Vellacott, late Captain, South African Constabulary.

The undermentioned to be temporary Lieutenants:—

Dated July 7th: Ernest Charles Arnold.

Dated Sept. 29th: Patrick Henry Lang.

Dated Oct. 7th: David Phillips Williams.

Dated Nov. 1st: William Arthur Rees.

Dated Nov. 2nd: Patrick Kinmont, Robert Thomas Forster, Ronald Stevenson Dickie, and Francis Wardlaw Milne.

The undermentioned to be temporary Honorary Lieutenants:—

Dated Nov. 9th: Tertius Thomas Boswall Watson, Ralph Godfrey Michelmore, and Wilfrid Davison Newcomb.

Dated Nov. 10th: Humphrey Nockolds, whilst serving with No. 3 British Red Cross Hospital.

Temporary Honorary Captain J. L. Dickie, having ceased to serve with the British Red Cross Hospital, Netley, relinquishes his commission (dated Nov. 18th).

The undermentioned are granted temporarily the honorary rank of Lieutenant whilst serving with No. 2 British Red Cross Hospital:—

Dated August 11th: James Lindsay, Ernest Milne Eaton, Frederick Wood Hamilton, and Lorimer John Austin

TERRITORIAL FORCE.

Army Medical Service.

Lieutenant-Colonel Charles Averill, from Deputy Assistant Director of Medical Services, to be Assistant Director of Medical Services, Welsh Division (temporary).

Captain (temporary Major) Henry J. Dunbar, from Welsh Field Ambulance, to be Deputy Assistant Director of Medical Services, Welsh Division (temporary).

Royal Army Medical Corps.

Welsh Border Mounted Brigade Field Ambulance: Lieutenant Frank L. Newton to be Captain.

East Lancashire Field Ambulance: Lieutenant Graham Stevenson to be Captain. Benjamin Robertshaw to be Lieutenant.

West Lancashire Field Ambulance: Lieutenant Leonard B. Stott to be Captain.

South Midland Field Ambulance: To be Captains: Cyril Claude Lavington (late Captain in this Unit), and Captain Ernest E. B. Landon, from Attached to Units other than Medical Units.

Northumbrian Field Ambulance: Lieutenant Wilson H. Morrison, from Attached to Units other than Medical Units, to be Lieutenant.

Northern General Hospital: The following are seconded: Captain Joseph le F. C. Burrow (for duty with North Midland Mounted Brigade Field Ambulance), Captain John B. Hall (for duty with East Anglian Casualty Clearing Station), and Captain William R. Higgins. The undermentioned Lieutenants to be Captains: Henry J. Smith and Christopher W. Sharpley.

Southern General Hospital: Lieutenant-Colonel Edmund C. Board resigns his commission on account of ill-health. Lieutenants to be Captains: Alfred P. Phillips and Arthur C. Tibbits.

London (City of London) Sanitary Company: James Philip Elias to be Lieutenant.

London Sanitary Company: Lieutenant Edwin J. Messent to be Captain. Serjeant Harold Stanton Tebbitt, from 1st London Sanitary Company, to be Lieutenant. Second Lieutenant Kenneth Bertram Williamson, from the Unattached List for the Territorial Force, to be Lieutenant.

East Anglian Casualty Clearing Station: Lieutenant Robert C. S. Smith to be Captain.

Home Counties Casualty Clearing Station: Henry Ray Parsloe to be Lieutenant.

East Lancashire Casualty Clearing Station: To be Lieutenants: Walter Briggs and Jeffrey Ramsay.

London Casualty Clearing Station: Captain Claude H. S. Frankau to be temporary Major.

London Mounted Brigade Field Ambulance: Henry Fulton (Honorary Major, retired, Special Reserve, late Captain, London Signal Companies (Army Troops), Royal Engineers) to be Major.

Home Counties Field Ambulance: Major Arthur T. Falwasser to be temporary Lieutenant-Colonel.

London (City of London) Field Ambulance: Captain Louis Courtauld is seconded.

Attached to Units other than Medical Units.—To be Captains: Captain John Cook, from Welsh Field Ambulance, Lieutenant Archibald Oliver, Lieutenant Robert U. Moffatt, and George Richard Wilson (late Captain, the East Lancashire Regiment).

DEATHS IN THE SERVICES.

Surgeon-Major Augustus Morphew, at his residence, St. Edwards, Mundesley, on Nov. 29th, aged 82. He entered the service in 1856, took part in the operations on the West Coast of Africa in 1860-61, and also in the operations against the King of Quiah. He retired in 1897.

HOSPITAL SUNDAY FUND AT PLYMOUTH.—Collections were recently taken in the "Three Towns" for the Hospital Sunday Fund, and as a result the sum of £571 was obtained. This is exclusive of £48 which was collected in the local Sunday schools.

ÆSCULAPIAN SOCIETY.—A meeting of this society was held at the Metropolitan Hospital, Kingsland-road, N., on Nov. 26th, when Dr. David Ross presided over a very good attendance.—Dr. P. Hamill was elected as president for the ensuing year, and delivered a brief presidential address on Heart Failure, discussing the factors underlying the clinical phenomena in the light of recent research.

VITAL STATISTICS.

VITAL STATISTICS OF LONDON DURING OCTOBER, 1915.

IN the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the 10 diseases specified in the table was equal to an annual rate of 9·6 per 1000 of the population, estimated at 4,516,612 persons; in the three preceding months the rates were 6·9, 5·9, and 8·1 per 1000 respectively. The lowest rates for the month were recorded in Kensington, Hammersmith, Chelsea, St. Marylebone, Hampstead, and Southwark; and the highest rates in St. Pancras, Stoke Newington, Shoreditch, Bethnal Green, Stepney, and Wandsworth. The prevalence of scarlet fever showed a considerable increase over that recorded in other recent months; among the several metropolitan boroughs this disease was proportionally most prevalent in St. Pancras, Islington, Stoke Newington, Finsbury, Shoreditch, Bethnal Green, Stepney, Wandsworth, and Woolwich. The Metropolitan Asylums Hospitals contained 3072 scarlet fever patients at the end of the month, against 2400, 2334, and 2732 at the end of the three preceding months; the weekly admissions averaged 434, against 307, 273, and 381 in the three preceding months. Diphtheria also was much more prevalent than it had been in other recent months; the greatest proportional prevalence of this disease was recorded in Fulham, the City of Westminster, St. Pancras, Stoke Newington, Shoreditch, Bethnal Green, Stepney, and Wandsworth. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals at the end of the month was 1620, against 1078, 1133, and 1418 at the end of the three preceding months; the weekly admissions averaged 241, against 147, 143, and 213 in the three preceding months. Enteric fever was slightly more prevalent than it had been in the preceding month; among the several metropolitan boroughs this disease was proportionally most prevalent in Hammersmith, Shoreditch, Southwark, Bermondsey, Wandsworth, Deptford, and Greenwich. There were 49 enteric fever patients remaining in the Metropolitan Asylums Hospitals at the end of October, against 63 and 47 at the end of the two preceding months; the weekly admissions averaged 9, against 9 and 7 in the two preceding months. Erysipelas was proportionally most prevalent in St. Mary-le-bone, Finsbury, Shoreditch, Bethnal Green, Bermondsey, Camberwell, Deptford, and Greenwich. The 24 cases of puerperal fever notified during the month included 5 in Poplar, 4 in Paddington, 3 in Camberwell, and 2 in Lewisham. The 14 cases of cerebro-spinal meningitis included 3 in Shoreditch, 3 in Battersea, 2 in Hackney, and 2 in Bethnal Green; while of the 21 cases notified as poliomyelitis, 6 belonged to Hammersmith, 4 to Battersea, and 3 to Islington.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided; the death-rates from all causes are further corrected for variations in the sex and age constitutions of the populations of the several boroughs. During the four weeks ending Oct. 30th the deaths of 5050 London residents were registered, equal to an annual rate of 14·6 per 1000; in the three preceding months the rates were 11·1, 11·6, and 14·0 per 1000. The death-rates for the month ranged from 9·8 in Wandsworth, 11·3 in Battersea, 11·7 in Hampstead, Hackney, and Lewisham, 12·6 in Kensington, and 12·9 in Woolwich, to 18·5 in Stepney, 18·8 in Poplar, 18·9 in Southwark, 19·5 in Bermondsey, 19·6 in Shoreditch, and 20·3 in Finsbury. The 5050 deaths from all causes included 676 which were referred to the principal infectious diseases; of these, 7 resulted from measles, 21 from scarlet fever, 66 from diphtheria, 36 from whooping-cough, 15 from enteric fever, and 531 from diarrhœa and enteritis among children under 2 years of age. The 7 deaths from measles showed a decline of 77 from the corrected average number, and included 2 in Southwark. The 21 fatal cases of scarlet fever were 6 in excess of the corrected average; of these 21 cases, 4 belonged to Stepney, 3 to Wandsworth, and 2 each to Islington, Hackney, and Woolwich. The 66 deaths from diphtheria were 15 above the corrected average number; this disease was proportionally most fatal in Fulham, Hackney, Holborn, Finsbury, Stepney, Poplar, Southwark, and Battersea. The 36 deaths from whooping-cough slightly exceeded the average, and included 7 in Southwark, 6 in Stepney, 6 in Poplar, 3 in Battersea, and 2 each in Fulham, Islington, Finsbury, and Lambeth. The 15 fatal cases of enteric fever were 6 below the corrected average, and

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING OCTOBER, 1915.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated population in the middle of 1914.	NOTIFIED CASES OF INFECTIOUS DISEASE.											DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.									Deaths from all causes.	Death-rate per 1000 living.†
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.		
LONDON	**4,516,612**	—	**1825**	**995**	—	**50**	**1**	**24**	**380**	**14**	**21**	**3310**	**9·6**	—	**7**	**21**	**66**	**36**	**15**	**531**	**676**	**2·0**	**5050**	**14·6**
West Districts.																								
Paddington	142,055	—	52	24	—	—	—	4	13	—	1	94	8·6	—	1	1	2	1	—	26	31	2·8	163	14·9
Kensington	170,817	—	33	14	—	—	—	—	8	—	—	55	4·2	—	—	—	—	—	—	10	10	0·8	166	12·6
Hammersmith	124,750	—	23	17	—	2	—	1	6	—	6	55	5·7	—	1	1	2	—	—	10	14	1·5	131	13·5
Fulham	158,849	—	54	48	—	—	—	—	4	1	—	107	8·8	—	—	1	4	2	—	14	21	1·7	160	13·5
Chelsea	63,791	—	6	14	—	—	—	1	3	—	—	24	4·9	—	—	1	—	—	—	7	8	1·6	67	13·0
City of Westminster	152,346	—	47	49	—	1	—	1	6	1	—	105	9·0	—	—	—	1	—	1	6	8	0·7	144	13·0
North Districts.																								
St. Marylebone	112,892	—	10	10	—	—	1	—	14	—	1	36	4·2	—	—	—	2	1	1	9	13	1·5	126	14·9
Hampstead	86,731	—	15	16	—	1	—	—	5	—	—	37	5·6	—	1	—	—	—	—	3	4	0·6	74	11·7
St. Pancras	212,497	—	178	61	—	2	—	1	22	—	1	265	16·3	—	—	—	1	—	1	30	32	2·0	249	15·3
Islington	324,764	—	165	67	—	3	—	1	19	—	3	258	10·4	—	—	2	3	2	1	41	49	2·0	397	15·5
Stoke Newington	50,454	—	29	16	—	1	—	—	2	—	—	48	12·4	—	—	1	—	—	1	1	3	0·8	53	13·0
Hackney	223,724	—	57	36	—	2	—	—	15	2	—	112	6·5	—	—	2	5	1	—	20	28	1·6	199	11·7
Central Districts.																								
Holborn	45,861	—	19	6	—	—	—	—	3	—	—	28	8·0	—	—	—	2	—	—	—	2	0·6	57	16·3
Finsbury	83,212	—	47	14	—	1	—	—	10	—	—	72	11·3	—	—	—	2	2	—	17	21	3·3	131	20·3
City of London	17,129	—	5	3	—	1	—	—	—	—	1	10	7·6	—	—	—	—	—	—	—	—	—	17	13·4
East Districts.																								
Shoreditch	108,869	—	80	36	—	3	—	—	26	3	—	148	17·7	—	—	—	2	1	1	37	41	4·9	159	19·6
Bethnal Green	127,662	—	77	50	—	—	—	1	19	2	1	150	15·3	—	—	—	2	—	—	32	34	3·5	149	15·8
Stepney	273,265	—	151	122	—	3	—	—	23	—	1	300	14·3	—	1	4	6	6	—	47	64	3·1	371	18·5
Poplar	160,222	—	66	20	—	1	—	5	11	—	—	103	8·4	—	—	—	4	6	—	31	41	3·3	233	18·8
South Districts.																								
Southwark	186,941	—	31	34	—	3	—	1	19	1	—	89	6·2	—	2	1	4	7	—	31	45	3·1	269	18·9
Bermondsey	124,213	—	44	34	—	2	—	—	15	—	1	96	10·1	—	—	—	2	—	1	29	32	3·4	186	19·5
Lambeth	296,724	—	102	36	—	3	—	1	15	—	—	157	6·9	—	—	1	4	2	3	27	37	1·6	352	15·2
Battersea	167,338	—	72	43	—	1	—	—	16	3	4	139	10·8	—	—	1	4	3	—	9	17	1·3	144	11·3
Wandsworth	338,998	—	180	102	—	5	—	—	17	1	—	305	11·7	—	—	3	6	—	—	26	35	1·3	255	9·8
Camberwell	262,020	—	76	42	—	2	—	3	34	—	—	157	7·8	—	—	—	3	—	—	28	31	1·5	286	14·0
Deptford	109,182	—	41	20	—	2	—	1	15	—	1	80	9·6	—	—	—	—	—	1	17	18	2·1	126	14·8
Greenwich	96,037	—	43	14	—	8	—	—	15	—	—	80	10·9	—	—	—	1	—	4	10	15	2·0	110	14·7
Lewisham	172,433	—	53	24	—	1	—	2	17	—	—	97	7·3	—	1	—	3	1	—	8	13	1·0	157	11·7
Woolwich	122,836	—	69	23	—	1	—	1	8	—	—	102	10·8	—	—	2	1	1	—	5	9	1·0	119	12·9
Port of London	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup. † The death-rates are corrected for variations in sex and age constitution of the populations of the several boroughs, the population of England and Wales being taken as the standard.

included 4 in Greenwich and 3 in Lambeth. The mortality from diarrhœa and enteritis among children under 2 years of age was proportionally greatest in Paddington, Finsbury, Shoreditch, Bethnal Green, Stepney, Poplar, Southwark, and Bermondsey. In conclusion, it may be stated that the aggregate mortality in London during the month from the principal infectious diseases, excluding diarrhœa, was 29·3 per cent. below the average.

HEALTH OF ENGLISH TOWNS.

In the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7107 births and 5805 deaths were registered during the week ended Saturday, Nov. 27th. The annual rate of mortality in these towns, which had increased from 13·8 to 15·9 per 1000 in the three preceding weeks, further rose in the week under notice to 16·7 per 1000 of their aggregate population, estimated at 18,136,180 persons at the middle of last year. During the first eight weeks of the current quarter the mean annual death-rate in these towns averaged 14·8, against a corresponding rate of 15·4 per 1000 in London. The annual death-rate last week ranged from 6·3 in Ilford, 7·5 in Eastbourne, 7·7 in Oxford, 8·9 in Acton, and 9·5 in Ealing, to 22·8 in St. Helens, 23·2 in Liverpool, 23·4 in Wigan, 24·2 in Salford, and 25·1 in West Hartlepool.

The 5805 deaths from all causes were 286 in excess of the number in the previous week, and included 373 which were referred to the principal epidemic diseases, against numbers declining from 973 to 345 in the eight preceding weeks. Of these 373 deaths, 125 resulted from infantile diarrhœal diseases, 72 from diphtheria, 70 from measles, 57 from whooping-cough, 34 from scarlet fever, and 15 from enteric fever, but not one from small-pox. The mean annual death-rate from these diseases was equal to 1·1, against 1·0 per 1000 in the previous week. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had steadily declined from 808 to 120 in the eight preceding weeks, slightly rose to 125 last week, and included 33 in London, 14 in Liverpool, 6 in Manchester, and 4 each in West Ham, Salford, and Leeds. The deaths attributed to diphtheria, which had been 71, 74, and 67 in the three preceding weeks, rose to 72, of which 14 were registered in London, 4 each in Plymouth and Manchester, and 3 each in Willesden, East Ham, Liverpool, Bolton, Bradford, Sheffield, and Hull. The fatal cases of measles, which had been 57, 67, and 65 in the three preceding weeks, rose to 70, and caused the highest annual death-rates of 2·6 in Hastings, 4·3 in Lincoln, and 5·1 in Gloucester. The deaths referred to whooping-cough, which had been 44, 51, and 49 in the three preceding weeks, rose to 57, and included 11 in London, 5 in Birmingham, 4 in Sheffield, and 3 each in Smethwick and Liverpool. The deaths attributed to scarlet fever, which had been 23, 20, and 31 in the three preceding weeks, further rose to 34, of which 10 occurred in London, 3 each in Stoke-on-Trent and Leeds, and 2 each in Liverpool and Preston. The fatal cases of enteric fever, which had been 23, 14, and 13 in the three preceding weeks, rose to 15 last week, and included 4 in London.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had declined from 3110 to 3027 in the four preceding weeks, further fell to 2927 on Saturday last; 318 new cases were admitted during the week, against 344, 339, and 336 in the three preceding weeks. These hospitals also contained on Saturday last 1570 cases of diphtheria, 57 of enteric fever, 47 of measles, and 8 of whooping-cough, but not one of small-pox. The 1484 deaths from all causes in London were 77 in excess of the numbers in the previous week, and corresponded to an annual death-rate of 17·1 per 1000. The deaths referred to diseases of the respiratory system, which had increased from 169 to 347 in the six preceding weeks, further rose to 398 in the week under notice, and were 74 in excess of the number registered in the corresponding week of last year.

Of the 5805 deaths from all causes in the 96 towns, 216 resulted from different forms of violence and 438 were the subject of coroners' inquests, while 1636 occurred in public institutions. The causes of 71, or 1·2 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Sheffield, Leeds, Bristol, West Ham, Bradford, Hull, and in 62 other smaller towns. Of the 71 uncertified causes, 14 each were registered in Birmingham and Liverpool, 4 in Preston, and 3 each in London, St. Helens, Warrington, Manchester, and Darlington.

HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,345,500 persons at the middle of this year, 921 births and 1020 deaths were registered during the week ended Saturday, Nov. 27th. The annual rate of mortality in these towns, which had been 16·1, 17·3, and 17·6 per 1000 in the three preceding weeks, further rose to 22·7 per 1000 in the week under notice. During the first eight weeks of the current quarter the mean annual death-rate in these towns averaged 17·2, against a corresponding rate of 14·8 per 1000 in the large English towns. The annual death-rate last week ranged from 8·5 in Kilmarnock, 13·9 in Aberdeen, and 14·3 in Leith, to 28·5 in Paisley, 29·5 in Coatbridge, and 29·7 in Hamilton.

The 1020 deaths from all causes were 230 in excess of the number in the previous week, and included 80 which were referred to the principal epidemic diseases, against 89 and 61 in the two preceding weeks. Of these 80 deaths, 29 resulted from measles, 15 each from scarlet fever, diphtheria, and infantile diarrhœal diseases, 5 from whooping-cough, and 1 from enteric fever, but not one from small-pox. The mean annual death-rate from these diseases was equal to 1·8, against 1·1 per 1000 in the large English towns. The deaths attributed to measles, which had been 15, 26, and 16 in the three preceding weeks, rose to 29, of which 9 occurred in Edinburgh, 8 in Hamilton, 4 in Glasgow, and 3 in Motherwell. The deaths referred to scarlet fever, which had been 12, 14, and 16 in the three preceding weeks, were 15 last week, and included 6 in Glasgow and 5 in Edinburgh. The fatal cases of diphtheria, which had been 9, 13, and 15 in the three preceding weeks, were again 15 last week; 7 deaths were registered in Glasgow, 3 in Edinburgh, and 2 in Greenock. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 18, 31, and 12 in the three preceding weeks, rose to 15, and included 8 in Glasgow and 2 each in Aberdeen and Falkirk. The 5 deaths referred to whooping-cough, of which 3 occurred in Glasgow, were slightly in excess of the average in recent weeks. The fatal case of enteric fever was registered in Glasgow.

The deaths referred to diseases of the respiratory system, which had been 150, 166, and 177 in the three preceding weeks, rose to 322 in the week under notice, and were 159 in excess of the number registered in the corresponding week of last year. The deaths from violence numbered 20, against 19 and 28 in the two preceding weeks.

HEALTH OF IRISH TOWNS.

In the 27 town districts of Ireland, with an aggregate population estimated at 1,212,380 persons at the middle of this year, 555 births and 467 deaths were registered during the week ended Saturday, Nov. 27th. The annual rate of mortality in these towns, which had been 15·8, 16·8, and 20·6 per 1000 in the three preceding weeks, fell to 20·1 per 1000 in the week under notice. During the first eight weeks of the current quarter the mean annual death-rate in these towns averaged 17·1, against corresponding rates of 14·8 and 17·2 per 1000 in the English and Scotch towns respectively. The annual death-rate last week was equal to 24·1 in Dublin (against 17·1 in London and 25·4 in Glasgow), 18·1 in Belfast, 21·8 in Cork, 20·2 in Londonderry, 24·4 in Limerick, and 22·8 in Waterford, while in the 21 smaller towns the mean death-rate did not exceed 14·4 per 1000.

The 467 deaths from all causes were 11 fewer than the number in the previous week, and included 47 which were referred to the principal epidemic diseases, against 36 and 31 in the two preceding weeks. Of these 47 deaths, 17 resulted from infantile diarrhœal diseases, 10 each from measles and scarlet fever, 9 from whooping-cough, and 1 from enteric fever, but not one from diphtheria or from small-pox. The mean annual death-rate from these diseases was equal to 2·0, against corresponding rates of 1·1 and 1·8 per 1000 in the English and Scotch towns respectively. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had declined from 36 to 9 in the five preceding weeks, rose to 17, of which 12 were recorded in Dublin. The deaths attributed to measles, which had been 2, 3, and 6 in the three preceding weeks, further rose to 10, and comprised 7 in Dublin and 3 in Belfast. The deaths referred to scarlet fever, which had been 4, 6, and 3 in the three preceding weeks, rose to 10, of which 7 were recorded in Belfast and 3 in Dublin. The fatal cases of whooping-cough, which had been 2, 4, and 8 in the three preceding weeks, were 9 last week, and included 2 each in Dublin, Belfast, and Londonderry. The fatal case of enteric fever was recorded in Cork.

The deaths referred to diseases of the respiratory system, which had increased from 53 to 98 in the four preceding weeks, further rose to 117 in the week under notice. Of the 467 deaths from all causes, 138, or 30 per cent., occurred in public institutions, and 5 resulted from violence. The causes of 25, or 5·4 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest; in the large English towns the proportion of uncertified causes did not exceed 1·2 per cent.

* Including membranous croup. † The death-rates are corrected for variations in sex and age constitution of the populations of the several boroughs, the population of England and Wales being taken as the standard.

Correspondence.

"Audi alteram partem."

DOUBLE EPISIOTOMY DURING LABOUR.

To the Editor of THE LANCET.

SIR,—Dr. John Phillips writes in THE LANCET of Nov. 27th recommending this operation, which, in my opinion, is one that should not be performed. I hope that your readers, before performing it, will note the many opinions which have been expressed against it. Dr. Phillips says: "Parvin was one of the earliest advocates of the operation in America." It seems to me that in the 1905 edition of his "Science and Art of Obstetrics" Parvin advocates it with faint praise. This is all he says about it in ordinary type:—

Episiotomy. If a serious tear of the perineum seems inevitable, many advise that an incision or incisions be made to prevent this accident. This practice, though generally credited to Michaelis, 1810, was recommended by Ould, 1742."

In small type he goes on to say:—

Opinions differ as to the necessity for incisions, and also on the part of those who approve of the operation as to where they should be made. The late Dr. A. H. McClintock stated that he had so often seen the perineum escape laceration where this accident seemed inevitable, he was led to doubt the possibility of recognising the cases in which incision is an absolute necessity. ..... Tarnier states that the incisions do not always prevent even quite extensive tears, and they may leave deformity and a painful cicatrix, or the duct of one of the vulvo-vaginal glands may be divided and a fistula result. ..... He cautions against episiotomy unless it is quite indispensable, for he has sometimes seen the incised parts covered with eschars and become the medium of grave infectious accidents. Delore states that he accepts in extreme cases the slight operation, but in ordinary cases it is preferable to have a median rent which cicatrices uniformly than two external ones which result in deformed cicatrices.

Dr. Parvin quotes two authors only, Dr. Broomall and Dr. Manton (whose names as obstetrical authorities are unknown to me), as favouring the operation, but sums up the matter in these words:—

It may be stated that episiotomy will very seldom be plainly indicated, and in private practice will rarely be done.

Dr. Munro Kerr says:—

It is an operation which is rarely required.

Dr. Dakin says of episiotomy, whether unilateral or bilateral:—

This will possibly enable the head to pass the vulva more rapidly, but that is all that can be said for it. On the other hand, it is in the first place never certain that laceration will occur at all and the cuts may be useless and, what is more, afford an entrance to septic matter. In the second place, laceration may occur even when episiotomy has been done. In the third place, a tear made by the head, if properly sutured, heals most satisfactorily even when it extends into the rectum, and in these severe cases episiotomy would be useless. It is therefore not to be recommended under any circumstances unless a dense cicatricial condition of the perineum is found, when possibly some harm might be averted by a central incision carried as far as the sphincter if necessary.

Having given a few of the adverse opinions of obstetricians of great experience, with whose views I entirely agree, I may add that episiotomy incisions sometimes extend and, dividing the fascia and levator ani, give rise to rectocele of the most intractable kind. I have such a case under my care at the present time.

I am, Sir, yours faithfully,

HERBERT R. SPENCER, M.D. Lond.

Harley-street, W., Nov. 27th, 1915.

HYPERTONIC SALINE AND BACTERIAL GROWTH IN WOUNDS.

To the Editor of THE LANCET.

SIR,—In the lecture which Colonel Sir Almroth Wright gave on "Wound Infections and their Treatment" (Part III.) he gives an experiment to illustrate the effect of hypertonic saline on pus. The deductions drawn from this experiment do not appear to me clear, and I shall be glad to know whether I have misunderstood him.

I will quote the experiment as given by Sir Almroth Wright (see THE LANCET, Nov. 13th, p. 1064).

To study what will happen when 5 per cent. salt solution is brought into operation upon a suppurating surface and is afterwards diluted, we take a sample of pus, mix it with 5 per cent. salt solution, and then place it in the incubator. We then dilute with sterile water until we have brought down the content in salt to 0·85 per cent. and then we incubate for a further period of hours. After the expiration of that period we find—and we may put this down to the setting free of trypsin from the cells broken down by the strong salt solution—a much more luxuriant growth of microbes than in a control sample incubated for the whole period with physiological salt solution.

The deduction which he makes from this experiment is as follows:—

The conditions which prevail on denuded surfaces are, as we have seen, uncongenial to leucocytes. Now just as soon as the first leucocytes die and break up and set free their trypsin, all those in the neighbourhood become involved in the same ruin, and this provides for any microbes that have survived or come in from outside (in) an eminently favourable culture medium. After this we have very soon upon our wound surface in the place of an almost extinguished infection a luxuriant culture of microbes.

Therefore he suggests closure of the wound in order to restrict the infected surface.

The question I want to ask is, whether Sir Almroth Wright has other evidence that trypsin promotes "a more luxuriant growth of microbes"? In the experiment quoted one factor seems so evident that I cannot think it has escaped his observation, and that is, that while the leucocytes would all be broken down in the 5 per cent. salt solution, yet in the control sample with physiological saline there may be some leucocytes, active and possibly phagocytic; if this is so, it would account for the more luxuriant growth of microbes in the 5 per cent. saline. Also it would seem more according to nature if active leucocytes were added to the diluted 5 per cent. saline and then incubated. I know the reply is that "the conditions which prevail on denuded surfaces are uncongenial to leucocytes," therefore no leucocytes should be added to the sample of pus and diluted 5 per cent. saline. Yet in the "lymph cup" experiment Lieutenant H. H. Tanner showed that 3 c.cm. of 5 per cent. salt solution increased in three hours to 5 c.cm. due to dilution by lymph, and after that leucocytes emigrated into the fluid, and were phagocytic. Does Sir Almroth Wright think that all these leucocytes die soon after they reach a denuded surface?

He describes very clearly how the leucocytes form a layer on the wound after treatment with physiological salt solution, and he says further that—

If events were now allowed to take their course, the leucocytes which had been drawn up to the surface, and in particular, perhaps, those which had done service in the destruction of microbes, would not long maintain their vitality.

Why do the leucocytes in the "lymph cup" experiment maintain their vitality and cause a diminution of microbes (even, I suppose, in the presence of trypsin), while on a denuded surface they do not live long?—I am, Sir, yours faithfully,

Oxford, Nov. 29th, 1915. H. T. GILLETT, M.D.

PROFESSOR C. A. EWALD.

To the Editor of THE LANCET.

SIR,—I am sorry to hear of the death of Professor C. A. Ewald, of Berlin, whom I have known for more than 30 years, and I deplore the harsh terms in which the *Münchener Medizinische Wochenschrift* speaks of him (see THE LANCET, Nov. 27th, p. 1195). Both he and his wife were well known to many colleagues in this country, and in spite of the war I have never ceased to think of them as friends. When they were at the recent International Medical Congress Professor Ewald looked older than he appears to have been, but in other respects he was in fairly good health. His reputation as a writer on diseases of the digestive organs stood very high, both here and in America, where his character and attainments were warmly appreciated. A foreigner is not in the best position for forming an estimate of the opinion entertained of a man in his own country, but I should like to testify to the uniform gentleness and kindness of disposition he showed in all my relations with him. If there were any truth in the charge of hardness and lack of feeling it surely conflicts with our sense of justice to write in this way of the dead.

I am, Sir, yours faithfully,

Birmingham, Nov. 29th, 1915. ROBERT SAUNDBY.

ILLUMINATION IN OPERATIONS.

To the Editor of THE LANCET.

SIR,—The important question raised by Sir Berkeley Moynihan in THE LANCET of Sept. 18th as to colour and direct lights is one of interest to all surgeons. For some considerable time past I have pointed out that the day would come when surgeons would only operate by means of a constant light. It must be known to many that upon the continent reflected lights from powerful lamps outside the theatre have been in use for some time. It seems to me that the green colour is quite unnecessary and that the restful condition can always be obtained by operating in partially darkened rooms. At least, this is my experience. As to the question of light directed upon the operative area, of the advantage of such a system there can be no doubt, and that it is used by many surgeons in such a manner is common knowledge. What I wish to draw attention to is the neglect of the use of direct illumination. In all intranasal and throat operations I have for some time adopted the use of very small electric pea-lamps mounted upon silver stems. The darkened room and the use of such direct light is infinitely superior to the dazzling reflected light from a powerful lamp. I strongly recommend to the notice of abdominal surgeons the use of powerful lights encased in varying shaped glass tubes ½ and ¾ inch diameter; these lights must be carefully fixed in such tubes, and a complete vacuum formed; there will then be no heat whatever. Such lights can be plunged into the abdominal cavity without doing the least harm, and their diagnostic value will be found of great assistance. I am, Sir, yours faithfully,

Johannesburg, Oct. 20th, 1915. J. L. AYMARD.

PLEOMORPHISM OF GERMS.

To the Editor of THE LANCET.

SIR,—It may be worth while, without expressing any opinion regarding the possibility of a specific organism assuming various forms, to call attention to a fault in reasoning into which clinicians and pathologists fell in the past, and from which it is possible that some have not yet shaken free. The discovery of a specific cause of certain groups of symptoms led to the conclusion that every disease is due to a germ. This axiom is fully established. It does not follow that the converse is true—viz., "every germ produces a (specific) disease." The possibilities of reaction to toxins are very limited. We find three or four morphologically distinct germs producing an identical disease, typhoid fever. If we classify symptoms, not groups of symptoms, we find a given reaction evoked by a large number of different poisons. It may well turn out to be the case that there are many more kinds of pathogenic germ than there are diseases; and yet it would be a mistake to throw any doubt upon the individuality of "diseases." Each disease is a group of physiological reactions which always occur in combination, resulting in a condition which calls for a perfectly definite course of treatment.

I am, Sir, yours faithfully,

Southampton, Nov. 22nd, 1915. ALEX. HILL.

ABSENCE OF GLYCOGEN IN THE SUPRARENAL BODIES.

To the Editor of THE LANCET.

SIR,—Having found no reference in literature to the presence or absence of glycogen in the suprarenal bodies, I examined a series of these bodies from subjects of different ages on whom necropsies were performed. Seventeen suprarenal bodies were examined from nine subjects. The age, sex, and lesions which accounted for death are set out in the following table.

No.	Age.	Sex.	Cause of death.
1	8 days.	M.	Acute bronchitis and pharyngitis.
2	5 years.	M.	Broncho-pneumonia; diphtheria.
3	14 ,,	M.	Multiple embolism, heart failure, fibrosis of left ventricle.
4	24 ,,	F.	Septicæmia; acute ulcerative on chronic endocarditis.
5	35 ,,	F.	Heart failure; exophthalmic goitre.
6	38 ,,	M.	Diabetes mellitus with hæmachromatosis.
7	42 ,,	M.	Broncho-pneumonia; fractured spine (accident).
8	59 ,,	F.	Carcinoma of gall-bladder; operation laparotomy.
9	72 ,,	F.	Broncho-pneumonia; operation for removal of gall-stones.

(In every case except No. 6 both suprarenal bodies were examined.)

To demonstrate the presence of glycogen, the tissues were fixed in absolute alcohol, embedded in celloidin, and stained by Best's carmine method. As a control, portions of a Grawitz's tumour of the kidney and of two diabetic kidneys were fixed and embedded in the same way; sections of these were put through the staining process with each batch of sections of the suprarenal bodies. No glycogen was found in the diabetic kidneys. When,

however, the celloidin sections of the kidneys and other sections from portions embedded in paraffin were stained by hæmatoxylin-eosine, or van Gieson's method, no cells were found which showed the appearance of glycogenic infiltration as revealed by these stains. Further, no glycogen was found in the celloidin sections when treated with Lugol's solution. The diabetic kidneys selected were, therefore, free from glycogenic infiltration, and were of no service as controls. Abundant glycogen was demonstrated in the Grawitz's tumour on every occasion.

No glycogen was found in any of the suprarenals.

I am, Sir, yours faithfully,

JIVRAJ N. MEHTA, M.D.Lond., M.R.C.P. Lond.,
Assistant in the Pathological Institute of the London Hospital.

HERPES ZOSTER OF UNUSUAL DISTRIBUTION.

To the Editor of THE LANCET.

SIR,—A case of bilateral herpes zoster, the lesions having the following distribution, has just come under my care:—Front: A small patch in right submaxillary area (C. 3), a large patch just above right nipple, and a small one a little higher up on the left side (D. 4). Behind: Five small patches, one on and four behind the right ear (C. 3), a larger patch on the right shoulder (C. 4), a small one over the left scapula near the middle line (D. 4), and a larger one below the angle of the left scapula (D. 6). I believe I am correct in supposing that true herpes zoster of the body is very rarely bilateral, and send you this note accordingly.

It may be only a coincidence that I recently saw a very severe herpes of the occipital nerve at this station, but Mr. John Procter, who has practised here for some years, tells me that he sees a good deal of it. I have certainly seen more than the average number of cases of ordinary febrile labial herpes, one at least bilateral, during the past few months.—I am, Sir, yours faithfully,

Lydd, Nov. 26th, 1915. GORDON WARD, M.D. Lond.

PS.—Lieutenant Adamson, R.A.M.C., who sees most of the daily sick at this station, also agrees that there is an unusually large number of cases of herpes zoster (of the body).

MILITARY SERVICE AND THE POSITION OF THE OFFICERS OF THE WEST AFRICAN MEDICAL STAFF.

To the Editor of THE LANCET.

SIR,—I should like to draw attention to the anomalous position of officers of the West African Medical Staff who are serving with the Nigerian Expeditionary Forces in the Cameroons. As far as I am aware, there is nothing in their contract with the Colonial Office which implies or states their liability to be sent on active service, and though I have not the least doubt that practically all of them would volunteer for active service, if volunteers had been called for, yet the fact remains that they were sent on active service without the option of declining, were placed under military discipline and regulations, and have not been given military rank.

It is futile to argue that the medical officer, without military rank, obtains equal precedence and privileges with combatant officers of corresponding service; this argument might, no doubt, be deduced by reference to the Colonial Office and local Government regulations, but, if so, such privileges begin on paper and end there, and the fact remains that the medical officer without military rank has not the same standing with either the other European officers or the native troops as a combatant officer of equal service. If this is true in time of peace, when one's work is usually a combination of civil and military duties, as I believe it is, how much more is it likely to be true on active service? All other civilian officials, whose services have been commanded with the troops, such as transport officers, intelligence officers, and the like, have all without exception been accorded temporary military rank, so as to remove any anomalies in connexion with their position, and it is difficult to see why the medical officers should be the solitary exception, and even presuming that for various reasons it is undesirable for officers of the West African Medical Staff to possess military rank in times of peace they should be certainly granted it when on active service, not only for their own sake, but also because it would obviously make it easier for the military authorities to deal with them.

People who were conversant with conditions in the Royal Army Medical Corps before military rank was accorded to its officers will be aware, and be able to appreciate some of the difficulties likely to arise when civilian medical officers are detached for purely military duties. I believe that the medical officers of the Uganda and East African Colonial Services serving with the troops have been given rank corresponding to their position, why not also the West African Medical Staff?

I am, Sir, yours faithfully,

MEDICAL OFFICER ON ACTIVE SERVICE IN
Sept. 30th, 1915. CAMEROONS.

MEDICAL STUDENTS AND THE WAR OFFICE.

To the Editor of THE LANCET.

SIR,—Professor A. E. Shipley in your issue of Nov. 20th has stated very concisely and clearly what has been in my mind for some time past. The dearth of doctors, it must be admitted, if we are frank, is in large measure due to the past action of the now defunct Liberal Government. I do not wish to enter into the domain of politics and raise a polemical discussion on the good and bad side of the National Insurance Act. But we know the facts. There was a shortage before the war began, and now it has become acutely intensified by the call for men for active service. If we bear in mind that this will quickly amount to 10,000 doctors it is easy to see how the ranks of the profession have been, and will be, depleted, leaving the civil population barely cared for. It is to be feared that not a few of the 10,000 will fall victims to enemy bullets or disease during the rest of the campaign, while the annual loss from "natural causes" to the profession will maintain its usual average at least; possibly more owing to the extra strain on those left behind. It is not difficult to discern what will happen, therefore, when the war is over. Unless freshly qualified men are rapidly drafted in the shortage will last for years and be very embarrassing.

I have just come across a student advanced in his curriculum who has done seven months at a French base hospital in North France as a surgeon assistant or "adjutant," as I think the French call

them, at 1 sou per diem. In the French Royal Army Medical Corps or corresponding body there are hundreds of such from their second year up. They probably see more and learn more surgery in three months so placed than they would at home in three years. They are young, active, and full of zeal and vigour. Surely some of the places not filled in response to Sir Alfred Keogh's request could be so arranged for. For first dressings such men who have a full experience of the surgical out-patient department are quite as competent as the average practitioner. The demand for medical men has caused many of us heart searchings, and the *pros* and *cons* as to ability to help in active work have been raised and raised again and well weighed. Many of us are reluctantly driven to decide that active participation is impossible—it may be owing to health reasons or financial responsibilities and the care of dependents which have to be faced. The lack of a private income means a great deal unless one is a bachelor or can at once take rank as major or colonel owing to previous connexion with the Territorials. Personally I am one of the men who find it impossible to make myself one of the 2000, much as I would like. I need not enlarge on the special reasons, but when I put them before our local British Medical Association secretary he at once bade me think no more about it. There are hundreds, nay thousands, of the remaining members of the profession who are in civil practice so placed.

The limit of *medical* enlistment will soon be reached and these third-year men should be treasured and made use of in their own line of work. How many are there already away on active service—fighting? I know one man who has been officer in a battery of artillery at the front for over a year, who was on the point of completing his course; another well-known specialist doing purely military work. A D.D.M.S. will tell you, "Oh, if we send him back we lose a good combatant officer." Quite so, but as Professor Shipley says, "they cannot have it both ways."

I am, Sir, yours faithfully,

Peebles, Nov. 23rd, 1915. T. D. LUKE, M.D. R.U.I.

Obituary.

ARTHUR HAMILTON WHITE, L.R.C.P. & S. IREL.,

LATE PROFESSOR OF PATHOLOGY IN THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

THE death occurred on Nov. 27th of Professor Arthur Hamilton White, who retired recently from the chair of pathology in the School of the Royal College of Surgeons in Ireland. Already in bad heath, he contracted pneumonia a fortnight ago, and before many of his friends knew of his illness he passed away at the early age of 46 years.

Arthur Hamilton White was educated at King's College, London, and at the Royal College of Surgeons in Ireland, from which body he received his licence in 1893. He subsequently worked at advanced pathology at University College, London, and at Vienna, Berne, and Freiburg, returning to Dublin when he was appointed to the chair of pathology at his College. His life was a continuous struggle against ill-health. As a teacher he possessed the power of stimulating the interest of his pupils, who progressed under him though he often had not the physical strength to go systematically through a session. His research work suffered similarly. His energy of mind and ingenuity prompted him to first-rate work, but he had not the power to bring it to a termination. His scrupulous scientific spirit prevented his publications from being more numerous, but his energy in public affairs was great. At the Royal Academy of Medicine of Ireland he was honorary secretary and afterwards President of the Section of Pathology. He was honorary secretary of the Irish Committee of the British Medical Association, and was the first honorary secretary of the Conjoint Committees of the British and Irish bodies, on which fell the duty of guiding the profession in Ireland in face of the National Insurance Bill. In this connexion he worked without sparing himself, and his professional brethren owe him a deep debt of gratitude.

A personal friend writes:—"Arthur White's life, when regarded superficially, was full of sadness. With great gifts of intellect and character, all possibilities were thwarted by his persistent ill-health. But it is doubtful if he himself realised the sadness. When full of pain he was the most cheery of men; he was a lover of children, and with the simplicity of a child he got his pleasure from the simplest things. He had a deep sympathy for the *mauvais sujet* and the lame dog, though his own standards of life were of the highest. He should only have been in his prime when he died. Few men have left a better record of work honestly and unselfishly done under extraordinary difficulties."

THE LATE MR. J. ROBERTSON CREASE, F.R.C.S. EDIN.—Mr. J. Robertson Crease died at his residence, South Shields, on Nov. 20th, at the age of 76. A descendant of the Huguenot family of de Crecy, he was a native of Edinburgh, and received his medical education at Edinburgh University and the Royal Colleges, taking the qualifying diploma of the latter in 1861. Two years later he commenced practice in South Shields, where for more than 40 years he greatly interested himself in the institutional life of the town. Ambulance work especially appealed to him, and as chairman of the St. John Ambulance Association he organised many classes in the town and district. In 1868 he was appointed honorary surgeon to the South Shields Volunteer Life Brigade, a position which he held till the time of his death. In addition to all this public work he had been a justice of the peace for ten years and a regular attender on the bench. He leaves a widow, two daughters, and a son who is a medical man.

DONATIONS AND BEQUESTS.—The late Mr. Edwin Carr, of Leicester, bequeathed £5000 to the Leicester Royal Infirmary, £2000 to the Children's Hospital, £500 each to Dr. Barnardo's Homes and the Leicester Association for Promoting the General Welfare of the Blind, and £1600 among 10 other charities, chiefly in Leicester.

LONG SERVICE UNDER THE POOR-LAW.—At the last meeting of the Newton Abbot (Devon) board of guardians Dr. William McBeath wrote resigning the post of medical officer and public vaccinator for the Kingsteignton district. Dr. McBeath stated he was 71 years of age and had held the appointment for 20 years.

AN AMBULANCE TRAIN ON TOUR.—We have already noted the equipment of the newly-built London, Brighton, and South Coast Railway Company's ambulance train, which has now completed its tour of the company's line with the object of securing funds for comforts for the Railway Engineering Corps during the winter. The proceedings resulted in the receipt of £1537 1*s.* 6*d.* from the small charge per head for inspection which was made. The corps numbers over 1000 men.

The War.

THE CASUALTY LIST.

THE following names of medical men appear among the casualties announced since our last issue:—

Died of Wounds.

Lieutenant-Colonel A. A. Ross, R.A.M.C. (T.F.), 3rd Lowland Field Ambulance, was in practice in Edinburgh prior to the war.

Died.

Lieutenant J. C. Bell, R.A.M.C., attached to the 7th Royal Scots (T.F.), of dysentery; was in practice at West Coker, Yeovil, prior to the war.

Wounded.

Lieutenant F. T. Simpson, R.A.M.C., attached to the 2nd Dorset Regiment.

Captain R. W. S. Murray, R.A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Captain P. G. Irvine, 1st Battalion, 6th Gloucestershire Regiment, son of the late Major G. N. Irvine, R.A.M.C.

Major A. C. Hyde, 1st Oxfordshire and Buckingham Light Infantry, son of the late Surgeon Lieutenant-Colonel Hyde, I.M.S.

THE HONOURS LIST.

The following promotion for devotion to duty is announced:—

Lieutenant-Colonel R. Heard, Indian Medical Service, Railway Medical Transport Officer, Bombay, to be Brevet-Colonel.

THE CENTRAL MEDICAL WAR COMMITTEE.

The Central Medical War Committee for England and Wales has held several conferences with representatives of the Insurance Commissioners for England to consider the manner in which the interests of insured persons should be safeguarded, while enabling the medical profession to make an adequate response to the demands of the military services of the country for medical officers. On Wednesday last both parties had a conference at the offices of the Local Government Board with representatives of that body. The steps which should be taken in the interests of the public as a whole, including the public health and tuberculosis services, were discussed and a preliminary undertaking was reached on many details. The result should facilitate the task of the Central and of the local Medical War Committees which are engaged in recruiting medical officers for the Army and Navy.

THE CONVERSION OF COUNTY ASYLUMS INTO WAR HOSPITALS.

At the quarterly meeting of the Medico-Psychological Association of Great Britain and Ireland held on Nov. 23rd, Lieutenant-Colonel David G. Thomson, the President, delivered an address entitled "A Descriptive Record of the Conversion of a County Asylum into a War Hospital for Sick and Wounded Soldiers." After detailing the steps taken in Norfolk and in Norwich in particular, at the outbreak of war, Colonel Thomson, who is the superintendent of the Norfolk County Asylum, described the steps taken to convert this institution into a military hospital, when an advance on the Western Front was contemplated, and when the Lunacy Board of Control expressed willingness to try to provide 15,000 beds in asylums by clearing some asylums entirely of their ordinary patients and distributing them in other asylums. Two conferences were held early in the year in furtherance of this, and there are now, said Colonel Thomson, 12 asylums which have been converted into war hospitals, the receiving asylums charging the vacating asylums the actual cost of maintenance, but nothing in respect of rent, upkeep of buildings, or interest on capital. The proposals, he said, were carried out with commendable expedition, unanimity, and patriotism, and he described the proceedings at the Norfolk County Asylum as follows:—

It was agreed that the Norfolk County Asylum should be emptied and its 1050 patients received into other asylums in the group. Printed notices were sent to one or more relations or friends of every patient notifying them of the intended transfer and the destination, and giving opportunity of daily visit before the patient left. In 60 suitable cases the friends were encouraged to apply for the patient's discharge under Section 79, and the fact that 53 availed themselves of this relieved the pressure somewhat. Eventually the various parties of patients for the different asylums were made up, due regard being paid to each party consisting of the various classes of patients—e.g., the recent, acute, sick, infirm, epileptic, turbulent, convalescent, and working. All the transport arrangements by road and rail were made, the accompanying staff arranged for, and all the documents completed (including each patient's "case"). The parties began to leave on March 19th, and by March 31st 960, or an average of over 100 per weekday, were safely, without the least mishap or accident, transferred to nine different towns. Thirteen were too ill to move until two or three weeks later. After the departure the great and pressing work remained of converting a set of buildings designed and well adapted for the insane into a hospital for sick and wounded soldiers in the space of six or eight weeks. This involved the carrying out of many structural alterations, particularly as some of the doors would not comfortably admit a stretcher-party; also three lifts had to be installed. The bed accommodation under the new scheme was similar to that under the old—namely, 1050. There was some difficulty about the X ray and operating theatres, but these were so well met that those who were now working in those blocks said they could not be improved upon. Owing to the great demand all over Europe for surgical, X ray, and electro-therapeutic instruments, drugs, and furniture, some anxiety was natural, but the War Office showed uniform courtesy and promptitude, and a first-rate equipment was set up in good time. The asylum being near the Norfolk and Norwich Civil Hospital, the staff of that institution was appointed *en bloc* as the civilian visiting physicians and surgeons of the Norfolk War Hospital, including the radiologist, oculist, pathologist, and dentist, the terms of appointment being £1 for each day the hospital was visited. Owing to the dearth of younger medical men there was some difficulty in getting together a resident medical staff. At this war hospital there is a resident lady pathologist, working in a well-equipped laboratory, where she deals and reports upon all clinical specimens sent to or collected by her. The securing of such a highly qualified and numerous staff was only possible by obtaining the services of men medically unfit for active service and yet physically fit for the less arduous indoor duties of a hospital.

In conclusion, Colonel Thomson paid a warm tribute to the work of the two Commissioners of the Board of Control, Dr. E. Marriott Cooke and Dr. C. Hubert Bond, to whom was delegated the important work of acting as intermediaries in all the negotiations between the War Department and the

vacating and receiving asylums. Dr. Marriott Cooke, who was present at the meeting, gave some interesting details as to the 12 hospitals now established. 23,996 patients have already been admitted and treated, it appears 14,776 have been discharged or transferred by Nov. 1st; 100 have died, and there remain under treatment 9120, with vacant beds for 4108.

At the same meeting Lieutenant-Colonel H. A. Kidd gave an account of the work at the Graylingwell Military Hospital, Chichester. Out of 3000 patients admitted, 1250, he said, had returned to duty, 1000 had returned to light duty, and 600 had gone to convalescent hospitals, making 95 per cent. of the admissions. At this hospital in the first day 490 cases were received in 30 hours. Colonel W. J. N. Vincent, of Wadsley Hospital, near Sheffield, Dr. G. M. Robertson, and Sir George Savage also took part in an interesting discussion, which showed that the action of the Board of Control has been fruitful of good results, and that the superintendents, assistants, and nurses of the asylums have displayed great energy and resourcefulness in arduous circumstances.

PANEL MEDICAL PRACTITIONERS ON WAR SERVICE.—In accordance with a suggestion made by the Insurance Commissioners, the Medical Benefit Subcommittee of the London Insurance Committee have authorised a public announcement calling the attention of insured persons to the steps that they must take if they desire to change their medical attendants for the coming year when they have been hitherto on the lists of practitioners now absent on war service. Any insured person so situated, instead of being able to change merely by giving notice before the prescribed date, will have to satisfy the Medical Service Subcommittee that he has reasonable grounds for desiring to be removed from the list of the practitioner who has risked losing his patients by a response to the call of duty.

THE ANGLO-RUSSIAN HOSPITAL.—The Duke of Connaught has telegraphed that Canada will contribute £10,000 in order to equip and maintain 100 beds of the Anglo-Russian Hospital for one year. The gift was made to express Canadian appreciation of the heroism of the Russian armies. The hospital has now been established in the Dmitri Palace at Petrograd and the Empress of Russia has presented to it 30 000 roubles out of a fund at her disposal. On Nov. 24th a party left London, including the surgeon-in-chief, Mr. H. F. Waterhouse, Dr. Gould May, Mr. Douglas Harmer, and the assistant matron, Miss Bates. The matron and rest of the nursing staff started some weeks ago. Dr. T. J. Horder will join the hospital after Christmas.

THE ITALIAN SOLDIER IN THE TRENCHES.—Dr. Sabella, a distinguished Roman physician and dermatologist, has been called up for duty with his regiment at the front, and has been much struck with the striking improvement in the physique of his men since they have been on service, and this in spite of the hardships of war. This, he says, is mainly because they cannot buy drink. The Italian soldiers generally get a small ration of wine, but there is no sale of drink near the front, and there is besides no prostitution not only to spread venereal disease but to furnish a great incentive to drink. As Dr. Sabella sees his men now in the trenches they are stronger than they were when they joined and more resistant to disease; they are more cheerful too, however tired they may be. They have a more gallant bearing, a more confident soldierly glance, and a spirit that does not quail in danger. Immune to hardship they are prepared now for any exertion that may be demanded of them. The editor of the *Annali di Medicina Navale* (August, 1915), from which we quote, observes that the French have also noted the beneficent influence of life in the trenches under the tonic influence of the open air. Will these men return to work in stuffy offices? Will there not be a great reaction after the war, and demands for better ventilation, more cubic space, fewer houses on the ground, and no more skyscrapers?

A MATERNITY HOME FOR THE WIVES OF NAVAL AND MILITARY OFFICERS.—A private maternity nursing home for the wives of naval and military officers has been opened at Taplow House, Taplow, by Mrs. Du Pre, wife of Major W. B. Du Pre, Member of Parliament for South Buckinghamshire, who is on active service. Eighteen separate rooms are available. A matron and sister from a London hospital are in charge, with a fully trained staff under them. In cases of difficulty the local doctor is assisted by a specialist from London. A nominal fee of 2 guineas a week is charged while waiting and 4 guineas a week for the confinement, to include everything. We are glad to call attention to this beneficent piece of patriotic work, which will be a real boon to officers' wives who have temporarily given up their homes or who are living in these strenuous times where the amount of personal attendance is limited. The beautiful house is situated three-quarters of a mile from Taplow station, which is 28 minutes' run from Paddington.

IN AID OF THE WOUNDED.—At the Heritage Craft Schools, Chailey, Sussex, a series of functions in connexion with the Guild of Brave Poor Things and the Guild of Play has been arranged for the month of December. The proceeds will be used for the Princess Louise Military Wards in connexion with the London Hospital. This afternoon (Saturday, Dec. 4th), at 2.30, there will be a sale of work; on Dec. 20th, at the invitation of the Bishop of Lewes, carols are to be sung in the Schools Chapel with a tea and concert in the adjoining hall to follow. At the Chapter House, Southwark Cathedral, on Dec. 9th, at 1 P.M., the Bishop of Southwark will preside at a dinner and distribution of clothing, and on Dec. 10th, at 2.30 P.M., in the Regent-street Polytechnic, an entertainment will be given by the children of the Guild of Play. Tickets and further information may be obtained from Mrs. C. W. Kimmins, Old Heritage, Chailey, Sussex.

ENLISTMENT OF RED CROSS MEN.—In a letter to the chairman of the British Red Cross Society dated Nov. 24th, Lord Derby propounds a scheme for dealing with the men of military age and not medically unfit who are now working for the Red Cross. He suggests that all the men of serviceable age, whether married or single, should enlist under the group system, and that whenever possible single men be replaced by married. Instructions will then be given to the local War Office representatives to relegate to a later group than the one called up any man whom the county director of the society declares to be indispensable.

THE TORQUAY TOWN-HALL RED CROSS HOSPITAL.—Last week the new wards which have been added to the Torquay Town-hall Hospital were formally opened by the mayor, in the presence of a large gathering. The new wards provide 50 beds, and, including those at the Mount Annexe, make a total of 200 beds. Mrs. Silvia May Payne, M.B., B.S. Lond., is in medical charge of the hospital.

WAR WORK AT THE ROYAL HANTS COUNTY HOSPITAL.—At the quarterly meeting of governors of this hospital held on Nov. 24th it was reported that since the beginning of the war 727 military cases had been dealt with, 80 per cent. of which required operations or surgical treatment. In the electrical department 500 military patients had been X rayed, and help had been afforded to over 1500 soldiers during the same period. There were now in hospital 53 military patients, the larger proportion being sick cases from the Dardanelles.

KHAKI ARMLETS FOR INVALIDED SOLDIERS.—The War Office announced on Nov. 29th that khaki armlets will be issued to non-commissioned officers and men of the Regular Army and Territorial Force who have been discharged on medical grounds from the army since the commencement of the war. In the case of the Territorial Force, this only refers to non-commissioned officers and men who undertook the Imperial Service obligations.

NEW WAR HOSPITAL AT NEWPORT (MON.).—Woolaston War Hospital, Newport, a section of the 3rd Western General Hospital, which has been in course of construction for some months, was opened for the reception of wounded soldiers last week, when about 150 invalids from the Dardanelles were admitted.

OBITUARY OF THE WAR.

JAMES FAIRBAIRN FAIRLEY, M.D. MELB., F.R.C.S. ENG.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain J. F. Fairley, who died on Nov. 9th at the age of 27, adds to the list of Australians who have given their lives for the mother country. Born in Victoria in 1888, he had a brilliant career both at school and university. At the latter he took honours throughout his course, graduating M.B., B.S. in 1910, and M.D. in 1912. He then held house appointments at the Melbourne General and Children's Hospitals, afterwards proceeding to England, where he obtained his F.R.C.S. whilst acting as senior house surgeon at St. Peter's Hospital for Stone. He enlisted the day war was declared and proceeded to France, doing regimental duties with the 31st Heavy Battery for some months. Later he was transferred to the base hospital as operating surgeon for cerebral cases, and was making observations on this subject when he developed paratyphoid. He recovered sufficiently to be invalided to England, where he returned to his old post as soon as possible and was hard at work there when he died suddenly from cerebral vascular trouble, possibly a sequela of his infection.

Captain Fairley was an excellent athlete and an enthusiast in art and music, and above all, thorough and scientific in his surgical work, which he loved. Both as surgeon and citizen his loss will be much felt in Melbourne, where he was well known.

KENNETH ROBINSON, M.B., B.S. LOND.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant K. Robinson, who was killed in France on Sept. 25th, at the age of nearly 32 years, was the second son of Dr. James Robinson, of Rockfield, Dunscar, near Bolton, and one of four qualified brothers representing the fourth generation of medical men practising in the neighbourhood of Bolton. He matriculated in the University of Manchester in 1902, obtained the Conjoint qualification of M.R.C.S., L.R.C.P. in 1907, and graduated M.B., B.S. Lond. in 1912. He was an ardent lover of all out-door sports and an enthusiastic Rugby player, his size and vigour making him a valuable acquisition to the forward ranks of the University team. Relinquishing his practice in Llandudno in co-partnership with Dr. W. R. Nicol, he joined the 53rd Field Ambulance in March of the present year, and left for France in July, where, after doing excellent service with his ambulance, he became attached to the 12th Manchesters. His genial and amiable disposition towards everyone with whom he was associated attracted to him a host of friends, to whom he endeared himself by his consistent good-temper and unselfishness. His technical ability and energy were recognised and appreciated by his commanding officer and brother officers, although his opportunities of service were brief and so soon tragically ended. He was killed when proceeding from headquarters dug-out to dress a wounded man. A brother officer writes of him: "He was very enthusiastic in his work and spared no pains to bring his hospital as near perfection as possible. The men loved him for the big brotherly way he had, and respected him as an officer of ability." Outside his immediate circle he was somewhat shy and reserved in manner, but both at his home and Llandudno left an impression of a forceful character, with an entire absence of mannerism or conventionality which will make his place hard to fill.

Medical News.

ROYAL MEDICAL BENEVOLENT FUND GUILD.—At the drawing-room sale held in aid of the funds of the guild at Crewe House, London, on Nov. 24th, a sum of over £1000 was raised, a result on which the executive committee and stallholders may be thoroughly congratulated.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At the meeting of the society to be held this evening (Friday) at 8.30, at the West London Hospital, Dr. T. Grainger Stewart and Mr. H. S. Souttar will open a discussion on Fibrositis, with special reference to the condition as it follows on the injuries and diseases of war.

PUBLIC HEALTH REFORM IN TORONTO.—The Health Department of Toronto has been under examination by the Toronto Bureau of Municipal Research, and the report thereon has been appearing in the *Canadian Public Health Journal* during the last four months. The sanction of Dr. C. J. O. Hastings, the medical officer of health of Toronto, to an investigation and report of this scope implies a strong conviction of the efficiency and zeal of his staff and a praiseworthy desire for improvement which cannot fail of reward. There is criticism in the report, but footnotes tell of the removal of defects since their discovery by the Bureau, whose criticisms throughout are those of a devoted friend anxious for reformation, not of a candid friend eager merely to annoy. Toronto, a city of 450,000 inhabitants, had in 1910 a death-rate of 14·2, and spent on her Health Department £17,000; in 1914 £55,000 was spent and the death-rate had fallen to 11·2. Toronto is the second city in Canada, proud of her position, her history, and her manufactures, and also of her social service. But a Health Department even in such a city is not without difficulties. Population has been increasing rapidly and there is no recent census to give accurate death-rates. The health staff has been hurriedly enlarged to meet pressing needs, but finds its duties incompletely segregated and its offices distressingly overcrowded. Such defects reduce efficiency, and because "departments of health in so far as they are efficiently administered are an investment, not an expense," a great part of the report is a plea for better accommodation. All the usual departments are represented, the staff numbering some 250, of whom several have gone to the war; but the keenest efforts are those being made for care of the children. The agencies are prenatal clinics, maternity hospitals, birth registration, child welfare nurses, well baby clinics, mothercraft clinics, milk depôts, baby homes for illegitimate children, day nurseries, the preventoriums against consumption of the Daughters of Empire and other societies, children's hospitals, and a baby boat. The last-named is a ferry-boat which in very hot weather takes ailing infants and their mothers out on the lake for a blow. The notification of births is the keystone of this edifice, but it is in the hands of the province, not the city, and is hardly enforced. The bureau advises that 1*s.* be paid to medical men as a notification fee in order that information may come in quickly and allow work to be started on the baby at once. The bureau is anxious to see better accounts kept both of the time of employees and of the stock of stores, enabling the cost of

individual services to be more clearly differentiated and their value estimated. Score cards have done so well in stimulating milk-sellers to improve their methods it is hoped the principle may be extended to hotels, lodgings, and barbers' shops. The public will doubtless help the department by patronising those tradesmen to whom the Health Department gives a sanitary certificate. There is no doubt that the money ought to be found to make the recommended reforms practicable.

NAVAL AUXILIARY HOSPITAL AT TRURO.—The patients have been removed from the Truro workhouse, and the institution is now being altered and rendered suitable for a naval auxiliary hospital.

Flight-Lieutenant George B. Dacre, R.N., who has been awarded the D.S.O. for his service in the Dardanelles, is the son of Mr. John Dacre, M.R.C.S., of Clifton.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Midwives (Scotland) Bill.

THE text of the Midwives (Scotland) Bill which Mr. MCKINNON WOOD, the Secretary for Scotland, has introduced in the House of Commons, is published. The measure is framed on the model of a Midwives Bill for Scotland which, before the war broke out, had passed the House of Lords and the Scottish Grand Committee of the House of Commons. The terms of its 29 clauses need not, therefore, be quoted *in extenso*.

Clause I., it may be stated, lays down that after Jan. 1st, 1917, no woman who is not certified shall take or use the name or title of midwife. Further, from and after Jan. 1st, 1922, no woman "shall habitually and for gain attend women in childbirth otherwise than under the direction of a registered medical practitioner unless she is certified under this Act."

Other clauses of the Act make provision for the admission of existing midwives, the constitution of the Central Midwives Board for Scotland, the regulation of the issue of certificates, the exercise of disciplinary measures, and the local supervision of midwives. The Bill will apply to all districts in Scotland except such districts as the Local Government Board for Scotland may by order exclude from its operation.

HOUSE OF COMMONS.

WEDNESDAY, NOV. 24TH.

The Apothecaries' Hall of Ireland.

Mr. BYRNE asked the Under Secretary for War whether he was aware that an inspector was sent by the General Medical Council to report on the examination by the Apothecaries' Hall of Ireland of an officer, wounded in the Dardanelles, who desired to become qualified to serve in the Royal Army Medical Corps; and that the examiner in surgery, Dr. C. B. Maunsell, of Mercer's Hospital, who had himself been appointed by the General Medical Council to conduct the examination, thereupon refused to proceed with the examination on the ground that there existed no statutory authority for the inquisition, that no inspection had ever been attempted to be made by the General Medical Council under similar circumstances for the past 30 years, and that it would be improper to subject an officer of His Majesty's forces to espionage; whether he was aware that Dr. Maunsell had, in protest, since resigned the office of examiner in surgery to the Apothecaries' Hall, to which he was appointed by the General Medical Council, and that no other Dublin surgeon could be induced to accept the office under the present conditions of espionage; whether, as a result, it was for the time being impossible for this medical licensing board to qualify men to serve in the Royal Army Medical Corps; and would he say what action he proposed to take in the matter.—Mr. TENNANT replied: I do not think that I can add anything to the answer I gave to the honourable gentleman on Nov. 18th. The Army Council has no power to intervene in this matter.

Drug Tariff in Scotland.

Mr. CURRIE asked the Representative of the National Insurance Commissioners whether the new suggested drug tariff submitted to Scottish panel chemists for 1916 might be regarded as definitely withdrawn; if so, whether this was largely due to the opinion expressed by the chemists themselves that the suggestions of the Departmental Committee no this point were financially unsound; whether, before this new tariff was suggested, steps were taken to ascertain whether the Scottish Insurance Commissioners considered that it would be workable in Scotland; whether the English Commissioners had at their disposal an organisation corresponding to the central checking bureau in Glasgow; and to what extent, if any, expenditure had been required in Scotland arising out of, or corresponding to, the 1913-14 Treasury grant of £60,000 for excessive sickness in England and Wales.—Mr. C. ROBERTS said in reply: As considerable misapprehension appears to exist on this matter, the House will perhaps allow me to deal with it at somewhat greater length than is usual in an oral reply. The answer to the first part of the question is in the negative. Owing to the dissatisfaction expressed throughout Great Britain with certain features of the existing drug tariff a Departmental Committee on the subject was appointed in February last. Their report was laid upon the table in September, and the terms of service for 1916 offered to chemists in Great Britain under the National Insurance Acts are in accordance with their recommendations. Scottish chemists were represented upon the Committee, and 4 out of the 11 days on which the Committee heard evidence were devoted to evidence as to Scottish conditions, two days being occupied in hearing the secretary to the body which, I believe, represents Scottish chemists. As, however, this body is understood to desire an opportunity of amplifying the views expressed to the Committee I have undertaken to receive any such statement within a period which will allow the position in Scotland to be re-examined before July 1st next. Until that date I have undertaken that the existing tariff shall continue in force in Scotland, although the Pharmaceutical Society of Great Britain have recommended chemists in England and Wales to accept terms of service embodying the tariff recommended by the Committee as from Jan. 1st next. I need not remind the honourable Member that the financial results of the tariff thus recommended are capable of demonstration, and I have not yet been supplied with any evidence that these results would be inequitable in their working in Scotland. But, as I have stated above, it remains open to the representatives of Scottish chemists to adduce evidence to this effect. I fear that I do not understand the suggestion in the third part of the question. The honourable Member will be aware that the object of a Minister in remitting any question to a Departmental Committee is to obtain from them recommendations based upon such evidence as they decide to take on matters within their terms of reference. But I have already indicated how fully the Committee in fact inquired into the position before making their report. The answer to the fourth part of the question is in the negative, but the honourable Member may be sure that Insurance Committees in each part of Great Britain are equally desirous of preventing extravagance in prescribing, whatever the precise form of organisation adopted by them for the purpose, and one advantage of the tariff recommended by the Committee will be to assist them in such endeavours. The grant referred to in the last part of the question was voted to meet any need for its application arising in any part of Great Britain; no such need has, in fact, arisen in Scotland, except for a small sum granted in 1914 to meet the enhanced cost of certain drugs under war conditions. For the purpose of removing misconceptions on the whole subject I have arranged for a communication to be sent to each panel chemist in Scotland. I shall have pleasure in sending a copy of that communication to the honourable Member.

THURSDAY, NOV. 25TH.

Food on Hospital Ships.

Sir C. KINLOCH-COOKE asked the Under Secretary for War whether he was now in a position to give the House some information regarding the food provided on board ship for officers and men invalided home from the Dardanelles suffering from dysentery and enteric, and also regarding the provision on board ship of medical necessaries for such cases.—Mr. TENNANT answered: I am still awaiting further information, but if the honourable gentleman refers to hospital ships, I may inform him that these are supplied with a regular hospital diet and with the necessary medical comforts. Transports, as he is probably aware, are not intended to carry serious cases, but these ships are also provided with hospital comforts.

Sir C. KINLOCH-COOKE: Is the right honourable gentleman aware that a great number of men have been carried home on transports which have not been provided with hospital comforts?—Mr. TENNANT: I am of course aware that a large number of wounded men have been carried home on transports, and although I agree with the honourable Member as to hospital comforts running short on the transports in the first instance, that danger has now been averted.

Soldiers and Tuberculosis.

Mr. R. MCNEILL asked the Representative of the National Insurance Commissioners whether he was aware that many soldiers were invalided home from the front suffering from tuberculosis for whose care no proper provision was made;

that numbers of these patients were being treated at Brompton Hospital, but that on their discharge from the hospital no special sanatorium being provided for them, they were obliged to return to their own homes, thus endangering their families and others with the spread of the disease; and whether, seeing that these men were contributors under the National Insurance Act, he would request the Insurance Commissioners to place one or more of the sanatoria at present empty at the disposal of the War Office for the exclusive reception and treatment of soldiers suffering from tuberculous disease.—Mr. C. ROBERTS replied: The honourable Member will be aware that the military authorities are responsible for the treatment of tuberculous soldiers up to the date of their discharge from the army. In cases where further residential treatment is necessary on re-entry into civil life special arrangements, both administrative and financial, have been in operation for a considerable time, which secure that the necessary accommodation is made available without delay. I am sending the honourable Member a copy of a circular describing these arrangements, which I believe fully meet the case. If the honourable Member has any particular case in mind in which difficulty has arisen perhaps he will communicate with me.

Mr. MCNEILL: Is the honourable gentleman aware that there are large numbers of men discharged from the army long before they are cured of tuberculous disease, and that they are necessarily thrown upon their own resources?—Mr. ROBERTS: No. We have a special fund to deal with those cases. I believe that the arrangements are working very satisfactorily.

Army Medical Advisory Board.

Mr. SHIRLEY BENN asked the Under Secretary for War to state why no meetings had been held during 1915 of the Advisory Board for Army Medical Services; by whom and under what authority had the paid members been constantly consulted; and had a unanimous written opinion of any six out of 11 members been obtained during the present year on any question of policy.—Mr. TENNANT answered: I think my honourable friend will agree that it is desirable to modify administrative machinery created in peace to meet the requirements of war, and from this point of view it has been preferable to use the services of the Army Medical Advisory Board in the manner which I described in my answer of Nov. 22nd rather than the normal and more formal manner. The answer to the second part of the question is, of course, the Director-General of the Army Medical Service. As regards the last part of the question, I am not aware that there has been any want of unanimity amongst the members save that which is a usual and healthy symptom in mobile minds. The Board of which the members were always in agreement would not, I think, command great confidence.

Mr. RENDALL: Can the right honourable gentleman say when the last meeting was held?—Mr. TENNANT: I gave the answer to that the other day. It is the fact that since the war there has been no formal meetings, but there have been constant references and conferences amongst the members.

Sir R. COOPER: What is the object of having this Advisory Board if its members have never been called together to consider and advise upon such an important matter?—Mr. TENNANT: The honourable baronet cannot have seen the answer to which I have alluded, which was given on Nov. 22nd. It is to the effect that the duties performed by this Board have been absolutely invaluable, and that the medical service, which has been so good and so much admired, could not have been performed without their help.

Mr. GOLDSTONE: Is it the policy of the War Office not to hold meetings of the members who are available in this country?—Mr. TENNANT: It is the deliberate policy of the War Office not to hold merely formal meetings for no particular purpose. Conferences are very useful, and they are constantly being held.

Sir H. CRAIK: Is it not the case that medical advice is more effective if it is given by medical members separately and not by the Board?—Mr. TENNANT: In conference, I believe, that is so.

Midwives (Scotland) Bill.

Mr. MCKINNON WOOD (Secretary for Scotland), in moving the second reading of the Midwives (Scotland) Bill, said: This Bill is one with which the House is already familiar. In a previous session it has passed through the House of Lords, and has received a second reading in this House, and it has also been before the Scottish Grand Committee, It was at that time in the charge of the honourable Member for the Blackfriars Division of Glasgow (Mr. Barnes), but owing to circumstances into which I need not enter, time could not be found for the report stage or the third reading, and the Bill stopped after the Committee stage. A great many representations have been made to me by practically the heads of the medical profession and also by public health authorities and others that in this time of war there is special need for a Bill of this kind. The medical profession has been sadly depleted. A great many medical men have gone to the front, leaving rural districts inadequately provided with medical practitioners, so that competent midwives are absolutely necessary throughout Scotland. Another representation to which I attach a great deal of value comes from the Principal of Glasgow University, Sir Donald MacAlister, who is President of the General Medical Council and a member of the Highlands and Islands Medical Service Board. That gentleman brought before me very strong reasons showing the urgent need of this Bill for Scotland. The Scottish midwife is not able to obtain a formal qualification except in England. When she returns to Scotland she is not under the same control as the English midwife is. Altogether, I think the case for treating this as a matter of urgency is virtually made out on very high authority indeed. I need not enter into the details of the Bill, which has been fully considered by the House on a previous occasion. I hope that the House will give it a second reading.

Mr. BARNES said that the Bill was much needed, and for that reason he welcomed it. Certain words, however, had been inserted in the Bill in Committee, and to these words he strenuously objected. They were that no woman "shall habitually and for gain" practise midwifery. It seemed to him that they were so vague that they might lead to a good deal of litigation. Further, no provision was made in the Bill to give the National Association of Midwives in Scotland representation on the Council, although he appreciated the fact that there was provision for the representation of qualified midwives as soon as they were certified. He might move amendments in Committee, but whatever their fate he would rather see the Bill through than have its passage imperilled by a long discussion.

Mr. EUGENE WASON welcomed the Bill, which he regarded as long overdue. The Scottish representatives would do their best in facilitating its passage.

The Bill was then read a second time and committed to a Committee of the whole House.

TUESDAY, NOV. 30TH.

Protection of the Head in the Trenches.

Sir G. SCOTT ROBERTSON asked the Under Secretary for War whether he was aware of the possibly exaggerated importance which was being given by our soldiers at the front, officers and men alike, to their not being in possession of steel helmets; that they declared that these helmets reduced the casualty lists and lessened the number of serious head wounds remarkably, and that no French soldier was without one; and whether he could say when an issue of steel helmets would be made to regiments serving in the trenches.—Mr. TENNANT said in reply: I stated on Oct. 14th and 21st that helmets were already at that date being supplied to the troops in large quantities in accordance with the recommendations of the Commander-in-Chief. I have every reason for knowing that the Field Marshal Commanding-in-Chief is aware of the feelings of all ranks under his command in reference to this question and to others, and I have no doubt that he has taken these feelings fully into account in making his recommendations on this matter.

The Drug Fund.

Mr. BOOTH asked the Representative of the National Health Insurance Commissioners whether a new scheme had been drawn up for 1916 for the Drug Fund in England; whether the Advisory Committee recommended it or any conference of county committees; and what amount of clerical labour would this new method of calculation involve throughout the kingdom.—Mr. C. ROBERTS answered: Revised arrangements with regard to the drug-supply are being brought into operation for 1916 after consultation with, and upon the recommendation of, the Medical and Insurance Committee representatives upon the Advisory Committee. The clerical labour involved, for which special arrangements are being made, is not expected to entail on balance any additional expenditure.

WEDNESDAY, DEC. 1ST.

Midwives (Scotland) Bill.

The Midwives (Scotland) Bill passed through Committee without amendment. The Bill was subsequently read a third time.

The National Insurance Act.

Replying to a speech by Mr. CURRIE, Mr. C. ROBERTS, as representing the National Insurance Commissioners, stated that although he did not object to an inquiry into the finance and administration of the National Insurance Act at the right time, an occasion when the country was engaged in a great war was about the most inappropriate time that could be chosen to suggest such an inquiry.

BOOKS, ETC., RECEIVED.

SAMPSON LOW, MARSTON AND CO., LIMITED, London.

Modern Chemistry and its Wonders: A Popular Account of Some of the more Remarkable Recent Advances in Chemical Science for General Readers. By Geoffrey Martin, D.Sc., Ph.D. Price 7s. 6d. net.

SAUNDERS, W. B., COMPANY, London and Philadelphia.

Illustrated Medical Dictionary. Edited by W. A. Newman Dorland. Eighth edition, revised and enlarged. Price 19*s.* net; with thumb index, 21*s.* net.

Diseases of the Nose and Throat. By Algernon Coolidge, A.B., M.D., Professor of Laryngology in the Harvard Medical School. Price 6*s.* 6*d.* net.

Occupation Therapy. By Wm. Rush Dunton, Jun., M.A., Instructor in Psychiatry, Johns Hopkins University. Price 6*s.* 6*d.* net.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BIRLEY, J. L., M.B., B.Ch. Oxon., M.R.C.P. Lond., has been appointed Medical Registrar to St. Thomas's Hospital.

DOYNE, P. G., M.B., B.Ch. Oxon., F.R.C.S. Eng., has been appointed Ophthalmic Registrar to St. Thomas's Hospital.

HOFFMANN, GEOFFREY, M.B., B.C. Cantab., M.R.C.P. Lond., has been appointed Resident Assistant Physician at St. Thomas's Hospital.

MITCHINER, P. H., M.B., M.S. Lond., F.R.C.S. Eng., has been appointed Surgical Registrar to St. Thomas's Hospital.

SHAW, ARCHIBALD, M.D., C.M. Glasg., has been appointed Medical Officer of Health for the St. Austell (Cornwall) Urban District Council.

WYATT, J. M., M.B., B.S. Lond., F.R.C.S. Eng., has been appointed Obstetric Registrar to St. Thomas's Hospital.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BARNSTAPLE, NORTH DEVON INFIRMARY.—House Surgeon. Salary £100 per annum, with board, residence, and laundry.

BENENDEN, NATIONAL SANATORIUM, Kent.—Assistant Medical Officer. Salary £150 per annum, with board, residence, and washing.

BENGAL, INDIA, ASANSOL MINES BOARD OF HEALTH.—Chief Sanitary Officer for Asansol Mining Settlement. Salary Rs. 1200 a month, with house.

BETHNAL GREEN INFIRMARY, Waterloo House, Waterloo-road, N.E.—Assistant Medical Officer. Salary at rate of £280 per annum, with apartments, board, and washing.

BIRKENHEAD, BOROUGH HOSPITAL.—Senior and Junior House Surgeons. Salary £200 and £170 per annum respectively, with board and laundry. Also Junior House Surgeon. Salary £180 per annum, with board and laundry.

BOLTON INFIRMARY AND DISPENSARY.—Third House Surgeon. Salary £180 per annum, with apartments, board, and attendance.

BRISTOL ROYAL INFIRMARY.—House Physicians and House Surgeons. Salary at rate of £120 per annum, with board, apartments, and laundry.

CITY OF LONDON RED CROSS HOSPITAL, Finsbury-square, E.C.—Resident Medical Officer. Salary at rate of £200 per annum, with rooms, board, and laundry.

CROYDON COUNTY BOROUGH.—Temporary Female Medical Officer to Tuberculosis Dispensary. Salary at rate of 7 guineas per week.

DERBY, DERBYSHIRE ROYAL INFIRMARY.—House Surgeon. Salary £200 per annum, with board, residence, &c.

DERBYSHIRE HOSPITAL FOR SICK CHILDREN.—Female Resident Medical Officer for six months. Salary £200 per annum.

DUDLEY, GUEST HOSPITAL.—Senior Resident Medical Officer. Salary £150 per annum, with board, residence, attendance, and washing. Also Assistant House Surgeon for six months. Salary £120 per annum, with residence, board, and washing.

KING EDWARD VII.'S HOSPITAL FOR OFFICERS, 9, Grosvenor-gardens, S.W.—Resident Medical Officer.

KIRKMABRECK, PARISH OF, Creetown, Kirkcudbrightshire.—Medical Officer. Salary £40 per annum.

LEEDS PUBLIC DISPENSARY.—Female Resident Medical Officer. Salary £130 per annum, with board, residence, and laundry.

LINCOLN GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £30 per annum, with apartments, housekeeper, fire, and lighting.

LIVERPOOL, DAVID LEWIS NORTHERN HOSPITAL.—House Surgeon and House Physician for six months. Salary at rate of £100 per annum, with board.

LIVERPOOL ROYAL INFIRMARY.—House Surgeon. Salary £60 per annum, with board and residence.

LIVERPOOL, TOWNSHIP OF TOXTETH PARK POOR-LAW INSTITUTION AND INFIRMARY.—Two Assistant Resident Medical Officers. Salary £300 per annum, with board, washing, and apartments.

LONDON LOCK HOSPITAL, Harrow-road and Dean-street, W.—Honorary Anæsthetist. Also House Surgeon for three or six months. Salary at rate of £130 per annum, with rooms, board, and washing.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant Resident Medical Officer for six months. Salary at rate of £120 per annum, with board, lodging, and laundry.

LONDON THROAT HOSPITAL, 204, Great Portland-street, W.—House Surgeon. Salary £50 per annum

MANCHESTER, ANCOATS HOSPITAL.—House Surgeon. Salary £100 per annum, £10 per month war bonus, with board, lodging, and washing. Also House Physician. Salary £80 per annum, £10 per month war bonus, with board, lodging, and washing. Also Two Unqualified Residents. Salary £20 per annum, with board, lodging, and washing.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with apartments and board.

MELBOURNE, VICTORIA, AUSTRALIA.—Officer in Control of Institution for Preparation of Vaccines and Antitoxins. Salary £650 per annum.

PORTSMOUTH ROYAL HOSPITAL.—House Surgeon for six months. Salary £150 per annum, with board, &c.

PUTNEY HOSPITAL, Putney Common, S.W.—Resident Medical Officer. Salary £150 per annum, with residence, board, and laundry.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—Temporary Medical Officer. £25 per annum to cover travelling expenses. Also House Surgeon for six months. Salary £100 per annum, with board, residence, and washing.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Female Medical and Surgical Registrar.

ROYAL LONDON OPHTHALMIC HOSPITAL, City-road, E.C.—Assistant Surgeon.

SHEFFIELD, JESSOP HOSPITAL FOR WOMEN.—Female Junior House Surgeon, unmarried. Salary £80 per annum, with board, residence, and laundry.

SLEAFORD, KESTEVEN COUNTY ASYLUM, Lincolnshire.—Assistant Medical Officer.

SOUTHAMPTON, FREE EYE HOSPITAL.—House Surgeon. Salary £100 per annum, with board, lodging, and laundry.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—Junior House Surgeon. Salary £120 per annum, with rooms, board, and washing.

TRING, HERTS, Halton Camp West.—Medical Officers for 3/1st Home Counties Field Ambulance, Royal Army Medical Corps, for Foreign Service.

VENTNOR, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST ON THE SEPARATE PRINCIPLE.—Senior Resident Medical Officer. Salary £250 per annum, with board and lodging.

WARE UNION.—Medical Officer and Public Vaccinator. Salary £90 per annum.

WARRINGTON, LORD DERBY WAR HOSPITAL.—Chief Resident Surgeon. Salary £1 3*s.* 6*d.* per day, with board, lodging, and washing.

WEST HAM UNION INFIRMARY, Whipps Cross-road, Leytonstone, N.E.—Resident Assistant Medical Officer. Salary £300 per annum, with residential allowances.

WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.—Female House Surgeon. Salary £150 per annum, with board, apartments, and washing.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for Certifying Surgeon under the Factory and Workshop Acts at Millom, in the county of Cumberland.

Births, Marriages, and Deaths.

BIRTHS.

CHALLENOR.—On Nov. 23rd, at Cabin Hill, Rhos-on-Sea, the wife of Captain L. T. Challenor, R.A.M.C. (T.F.), of Christ Church Rectory, Manchester, of a son.

DUDDING.—On Nov. 28th, at Winteringham, Lincs, the wife of Major T. S. Dudding, R.A.M.C., of a son.

GLOVER.—At Kidbrook House, Blackheath, the wife of Dr. W. E. Glover, Colonial Medical Service, of a daughter.

MACNALTY.—On Nov. 28th, at FitzGeorge-avenue, W., the wife of A. Salusbury MacNalty, M.D. Oxon., of a daughter.

RAINEY.—On Nov. 28th, at Blackwater road, Eastbourne, the wife of E. Holmes Rainey, F.R.C.S. Eng., R.A.M.C., of a son.

SAVAGE.—On Nov. 21st, at The Ards, Hagley-road, Birmingham, the wife of Smallwood Savage, M.B. Oxon., F.R.C.S. Eng., of a son.

SCOTT.—On Nov. 27th, at Bentinck-street, Cavendish-square, W., the wife of Dr. S. Gilbert Scott, of a daughter.

WILLIAMS.—On Nov. 17th, at Lansdowne-road, Clapham, S.W., the wife of C. Williams, M.R.C.S., L.R.C.P. Lond., of twin daughters.

MARRIAGES.

EAGLETON—WOOD.—On Nov. 23rd, at Goring-on-Thames, Arthur Joseph Eagleton, M.B. Lond., Captain, R.A.M.C., to Mabel, youngest daughter of the late Mr. and Mrs. W. Wood, of Barnsley, Yorks.

DEATHS.

BELL.—On Nov. 22nd, at 17th General Hospital, Alexandria, of dysentery, Lieutenant J. C. Bell, R.A.M.C., aged 39 years.

BOULTER.—On Nov. 26th, at Richmond, Surrey, after a long illness, Harold Baxter Boulter, F.R.C.S. Eng., aged 63 years.

CARNALL.—On Nov. 17th, at Harrogate, of Bright's disease, Edward Carnall, M.R.C.S., L.S.A., D.P.H., in his 58th year. He was a Liveryman, a Freeman, and Apothecary of the City of London; served in the Boer War; married a daughter of the late W. Gibbon and a niece of the late Lord Furness.

MARSH.—On Nov. 26th, suddenly, at Abercromby-square, Liverpool, Nicholas Percy Marsh, M.B. Lond., M.R.C.S., aged 56 years.

MILLICAN.—On Nov. 28th, at 121A, North End-road, West Kensington, Kenneth William Millican, B.A. Cantab., M.R.C.S., aged 62 years.

MORLEY.—On Nov. 25th, suddenly, at Craven Hill-gardens, Alexander Morley, M.R.C.S., in his 80th year.

ROSS.—On Nov. 24th, at an Officers' Hospital in London, Lieutenant-Colonel A. A. Ross, R.A.M.C. (T.F.), 3rd Lowland Field Ambulance, aged 54 years.

SPENSLEY.—On Nov. 10th, at Officers' Prison Hospital, Mainz, Germany, Lieutenant James Richardson Spensley, R.A.M.C.

WELSH.—On Nov. 6th, suddenly, at Colombo Inman Welsh, M.R.C.S., L.R.C.P. Edin., of Sylverton, Parkwood-road, Boscombe, aged 69 years.

N.B.*—*A fee of 5*s. *is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

SWINE FEVER.

WE have received from the Edinburgh and East of Scotland College of Agriculture a pamphlet in which the investigator, Dr. J. P. McGowan, gives an account of an experimental research which he has conducted into swine fever.[1] Subjects and material for the investigation were furnished from an outbreak of the disease on a farm in the vicinity of Edinburgh in the spring of this year. Two types of organisms were obtained from the various lesions and organs examined, but Dr. McGowan considers that these two types are only variants of one and the same organism—viz., bacillus suisepticus. The pigs had been doing well previous to the outbreak, but there were one or two "wasters" among them. No swine fever had occurred at the place for a period of three and a half years previously, but diarrhœa among sucklings had often given trouble. The pigs were fed on refuse of human food from a large institution near at hand, and it is interesting to note that in Canada no compensation is allowed for pigs slaughtered for swine fever where the owner has been feeding the animals on waste of human food, for such procedure is considered there to be the source of most of the dangerous and troublesome outbreaks of this disease. They were carefully housed and kept clean. The symptoms among the pigs observed by Dr. McGowan were varied, the pigs went off food, in two cases there was running at the eyes and nose, in all only slight discolourations of the skin, and no coughing; in acute cases there was quick death and in other instances there were gradual emaciation and diarrhœa as a late symptom. Dr. McGowan does not hold that the disease is very infectious from pig to pig, but is of opinion that cases occur simultaneously owing to a single extensive cause acting on all the pigs together. Old-standing lesions due to the bacillus suisepticus were found in some of the pigs, and it is considered likely that a lowered vitality of the animals due to gross chilling (the weather being very inclement at the time) causes this organism to assume a virulent character and thus occasion the outbreak. In many cases no history of outside infection can be traced. The theory that an invisible non-filterable virus is alone the cause of the malady is not much favoured by the author of the pamphlet, for he thinks that it is possible that the supposed invisible virus is really a toxin circulating in the blood of affected subjects and derived from bacillus suipestifer, its variants, and bacillus suisepticus. Bacillus suipestifer may vary considerably in its biological reactions and may even be considered to be a variant of bacillus suisepticus. Whilst the possibility of the filter passer being the cause of swine fever is not denied, yet the evidence for this being the case is far from compelling.

As regards immunity, the nearer the antigen approaches that occurring naturally in the disease the better will the results of immunisation be; and an antigen manufactured by the action of the serum not only on B. suipestifer, but also on B. suisepticus, will have more immunising virtue than cultures on artificial media of B. suipestifer alone. To reduce loss from swine fever the investigator recommends attending promptly to the diarrhœa of sucklings, killing wasters and piners at once, protection of pigs from sudden exposure to cold and wet, and looking well after their general health.

HEALTH OF GAMBIA.

A REPORT on the Blue-Book for the year 1914 of the Colony and Protectorate of Gambia (which consists of the Island of St. Mary, British Kombo, Albreda, the Ceded Mile, MacCarthy Island, and various other islands and territories on the banks of the West African river Gambia, with a total area of about 4000 square miles) has just been issued. It states that the last Census (1911) gave the Colony a population of 7700 and the Protectorate one of 138,401—a total number of 146,101 inhabitants. This total has been increased by an annual influx of "strange farmers." The system of registration of births and deaths applies only to certain districts—viz., Bathurst, British Kombo, Ceded Mile, and MacCarthy Island. In these districts there has for several years been in the aggregate an excess of deaths over births. That excess was 36 in 1914, 43 in 1913, 33 in 1912, 12 in 1911, and 22 in 1910. The death-rate in the colony in 1914 was 26·14 per 1000 as against 21·42 in 1913, the increase being attributed to the heavier rainfall, which was double that of 1913, when the death-rate was the lowest recorded during the last ten years. The number of Europeans, including females, residing in the colony and protectorate during 1914 was 149, 56 of them officials. Eight Europeans, including two officials, were invalided to Europe. No European official died during the year. There were 1267 vaccinations performed at Bathurst and 921 in the Protectorate. There are two hospitals—one at Bathurst and one at MacCarthy Island. In the former there is accommodation for 4 first-class, 11 second-class, and 10 third-class male patients. The ward for females has accommodation for 17 patients, including two cots for children, and four rooms are provided for cases requiring isolation. During the year 556 in-patients were treated and there were 55 deaths, of which only one was that of a European. The total number of out-patients treated was 9799. A European medical officer is usually stationed at MacCarthy Island from October to June; during the remainder of the year, when there is only a small population on the island, a native dispenser is in charge of the hospital. There is one ward for Europeans and three wards for native patients. Fifty-one in-patients and 1323 out-patients were treated during the year. There is a building for contagious diseases about two miles from Bathurst. The colony was free from any epidemic during the year, but small-pox appeared in some parts of the colony and protectorate. Fourteen males and five females were admitted to the Home for Destitute and Afflicted Persons, which also serves as a hospital for such cases as the senior medical officer may consider would be more comfortably attended to there than in the general hospital. During the rainy season (June to October) the climate of the Gambia is damp and oppressive, and is more generally felt than in other places with heavier rainfall owing to the differences to be found during the remaining months of the year, which comprise the dry season. A meteorological station of the second class is maintained in Bathurst. The highest shade temperature recorded during 1914 was 101° F. in March and the lowest 53° in December. The rainfall was 49·91 inches.

A THEORY OF SEX.

IN his *Country-Side* leaflet for December, Mr. E. Kay Robinson enunciates a new theory of sex. According to him the first beginning of sex was a parasitism which gradually became improved into symbiosis, the partnership becoming closer until actual community of vital organs resulted and the two kinds of creature became one. Mr. Robinson has an ingenious mind, as his recent book on "The Meaning of Life" (Thomasons Limited, Nature Publishers, High-street, Hounslow, pp. 220, price 2*s.* 6*d.* net) testifies, but until he brings forward his promised evidence in support of his theory, his readers will do well to suspend judgment on it.

CONTENTS OF A WOUND.

A LETTER from an officer in the *Times* of Nov. 30th vouches for the statement that after the Loos attack a surgeon found in a wound of the groin the following articles in the order named: the blade of a pocket-knife, the bone haft of the same, a calico button, and the head (time-fuse) of a shell.

Velox asks for guidance as to the approximate number of opsonic examinations of the blood required in treating with the various serums a fairly advanced case of phthisis in a patient aged 22. The question does not lend itself to a summary answer. The term "serum" should be reserved for the group of remedies conveying passive immunity—i.e., protective bodies produced in some other animal and passed on ready-made to man. Many promises have been made by various remedies of this kind in tuberculosis (Maragliano, Marmorek, Mehnarto, and others), but fulfilment has lagged behind. The term "vaccine" should be used for the group of remedies designed to develop active immunity, of which Koch's old tuberculin is the best known. The opsonic index has been largely instrumental in working out safe methods of administration of tubercle vaccines, but now that experience has been gained many cases are treated without the opsonic control. Reference should be made to one of the text-books dealing with tuberculin treatment.

METEOROLOGICAL READINGS.

(Taken daily at 9.30 a.m. by Steward's Instruments.)

THE LANCET Office, Dec. 1st, 1915.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Nov. 25	30·220	N.W.	...	53	42	34	32	34	Cloudy
,, 26	30·140	N.	...	60	42	34	34	35	Cloudy
,, 27	30·320	N.E.	...	50	40	31	31	31	Overcast
,, 28	30·290	W.	...	48	35	31	30	33	Fine
,, 29	29·500	S.E.	0·09	50	50	33	37	38	Overcast
,, 30	29·226	S.W.	0·15	70	49	38	43	44	Cloudy
Dec. 1	29·220	S.W.	...	52	49	44	45	46	Cloudy

[1] Some Points in Connexion with the Pathology and Epidemiology of Swine Fever, by J. P. McGowan, M.A., M.D., B.Sc., M.R.C.P.E., Assistant Superintendent, Royal College of Physicians Laboratory, Edinburgh. Edinburgh: William Blackwood and Sons.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Friday, Dec. 10th.

CLINICAL (Hon. Secretaries—David Forsyth, T. P. Legg): at 8.30 P.M. *Cases* will be shown at 8 P.M.
Paper: Dr. F. Parkes Weber: Sequel to the Cases of Chronic Splenomegaly shown on January 12th, 1912.

RÖNTGEN SOCIETY, Institution of Electrical Engineers, Victoria Embankment, W.C.
TUESDAY.—8.15 P.M., General Meeting. Papers:—Mr. L. A. Levy: Some Remarks on Fluorescent and Intensifying Screens.—Mr. G. G. Blake: Further Notes on Localisation.

HUNTERIAN SOCIETY, 1, Wimpole-street, W.
WEDNESDAY.—9 P.M., Clinical and Pathological Evening. Mr. A. G. Buchanan: Practical Demonstration of Hypnotism. Discussion on the subject invited.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY.—10 A.M., Dr. Simson: Diseases of Women. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Addison: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Addison: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting). 4.30 P.M., Demonstration:—Mr. T. H. C. Benians: Clinical Pathology.
WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).
THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden-square, W.
MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.
TUESDAY.—4 P.M., Dr. J. L. Bunch: The Treatment of Nævi.
THURSDAY.—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: Erythema and Ul-erythema.

For further particulars of above Lectures, &c., see Advertisement Pages.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, AND WHEN ACCOMPANIED BY BLOCKS IT IS REQUESTED THAT THE NAME OF THE AUTHOR, AND IF POSSIBLE OF THE ARTICLE, SHOULD BE WRITTEN ON THE BLOCKS TO FACILITATE IDENTIFICATION.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET *should be addressed "To the Manager." We cannot undertake to return MSS. not used.*

MANAGER'S NOTICES.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION (printed on thin paper) is published in time to catch the weekly Friday mails to all parts of the world.

ALTERATION OF INLAND SUBSCRIPTION RATES.

OWING to the alteration in the Inland Newspaper Postal rate, the postage on each copy of THE LANCET will in future be 1*d.*, and sometimes 1½*d.*

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